

GRANULAR AGGREGATE RESOURCES OF THE CENTRAL LOWLAND AREA,
EAST-CENTRAL NEW BRUNSWICK

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GRANULAR AGGREGATE RESOURCES
OF THE
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Mineral Resources Division
Department of Forests, Mines and Energy
New Brunswick

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ABSTRACT

Reserves of granular aggregate material in the Central Lowland area of New Brunswick are estimated to exceed 49 million m³. More than half of these are associated with an esker system to the north of the Salmon River. Other major sources of aggregate are deposits in the Southwest Miramichi, Canaan, and Millstream River valleys, and a northerly trending esker system near Kent Lake. Most of these materials consist of coarse aggregate, predominantly of poor to very poor quality.

RESUME

On évalue à plus de 49 millions m³ le volume des réserves d'agrégat granulaire présent à l'intérieur de la région des basses terres centrales du Nouveau Brunswick. Plus de la moitié de ces réserves sont associées à un système d'esker situé au nord de la rivière Salmon. Les autres principales sources de granulats se trouvent dans les vallées des rivières Southwest Miramichi, Canaan et Millstream, ainsi que reliées à un système d'esker orienté vers le nord et situé près du lac Kent. Une grande proportion de ces matériaux comprend des granulats grossiers qui sont généralement de pauvre à très pauvre qualité.

INTRODUCTION

LOCATION AND ACCESS

The study area is located in east-central New Brunswick and extends from Boiestown and Oromocto northeastward to the Northumberland Strait coast (Figure 1). Covering an area of approximately 13,000 km², it lies primarily within the Central Lowland physiographic area and encompasses fifteen 1:50,000 scale NTS map areas (Figure 2).

Access within the area is via a number of interconnecting Provincial highways, and a network of local roads and logging roads. Access to all of the significant granular aggregate deposits is good.

PREVIOUS WORK IN THE AREA

Aspects of the regional surficial geology of the study area were first described by Chalmers (1885, 1888, 1890, 1895) in his early work on the surficial geology of New Brunswick. More recently, Quaternary geology mapping of the area was completed on a regional scale (Gadd 1973; Gauthier 1978, 1982, 1983; Gauthier and Cormier 1977; Rampton and Paradis 1981a, b, c). The results of these studies have been summarized by Rampton et al. (1984). In addition, surficial geology mapping of the

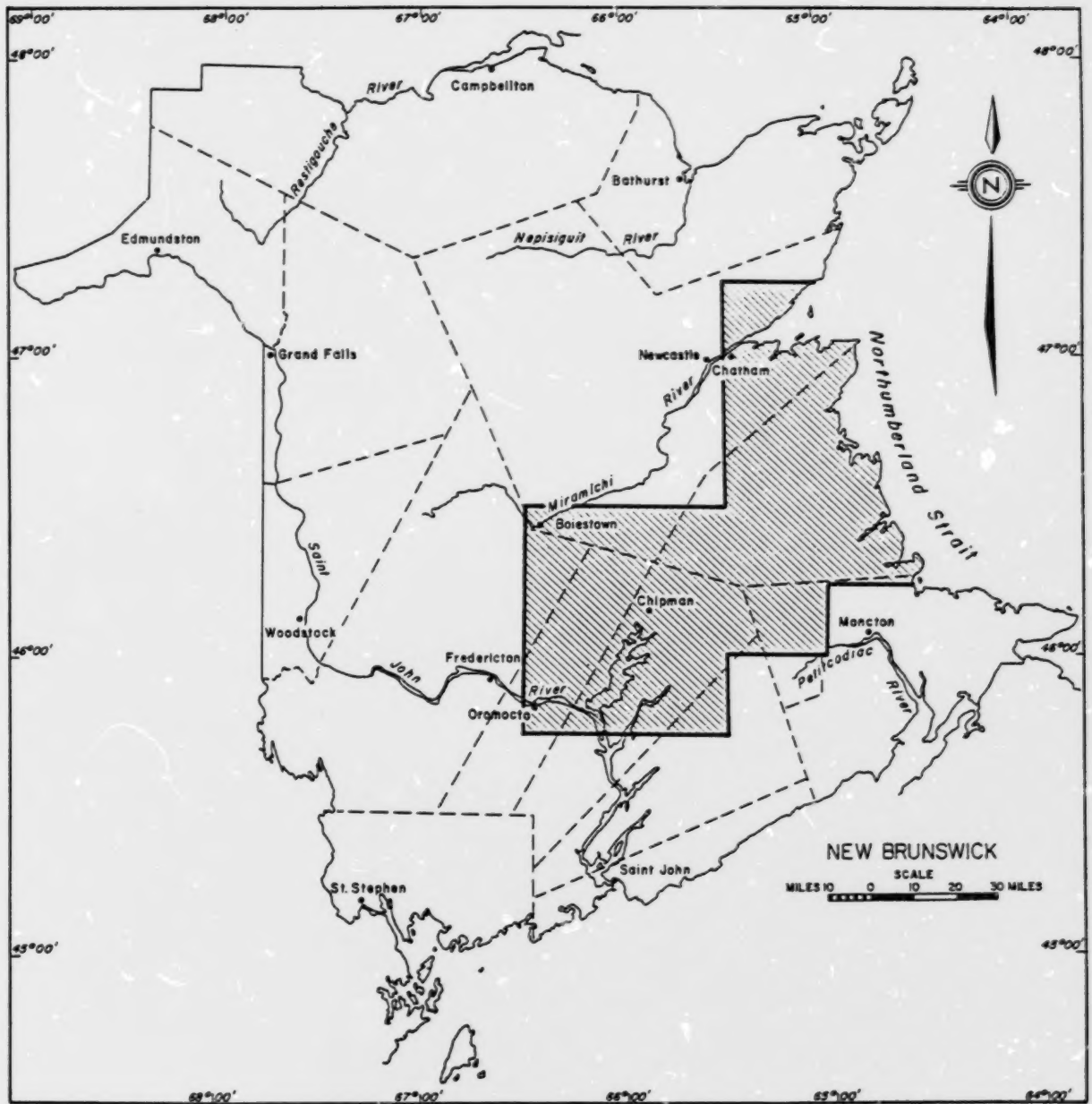


Figure 1. Map showing the location of the study area

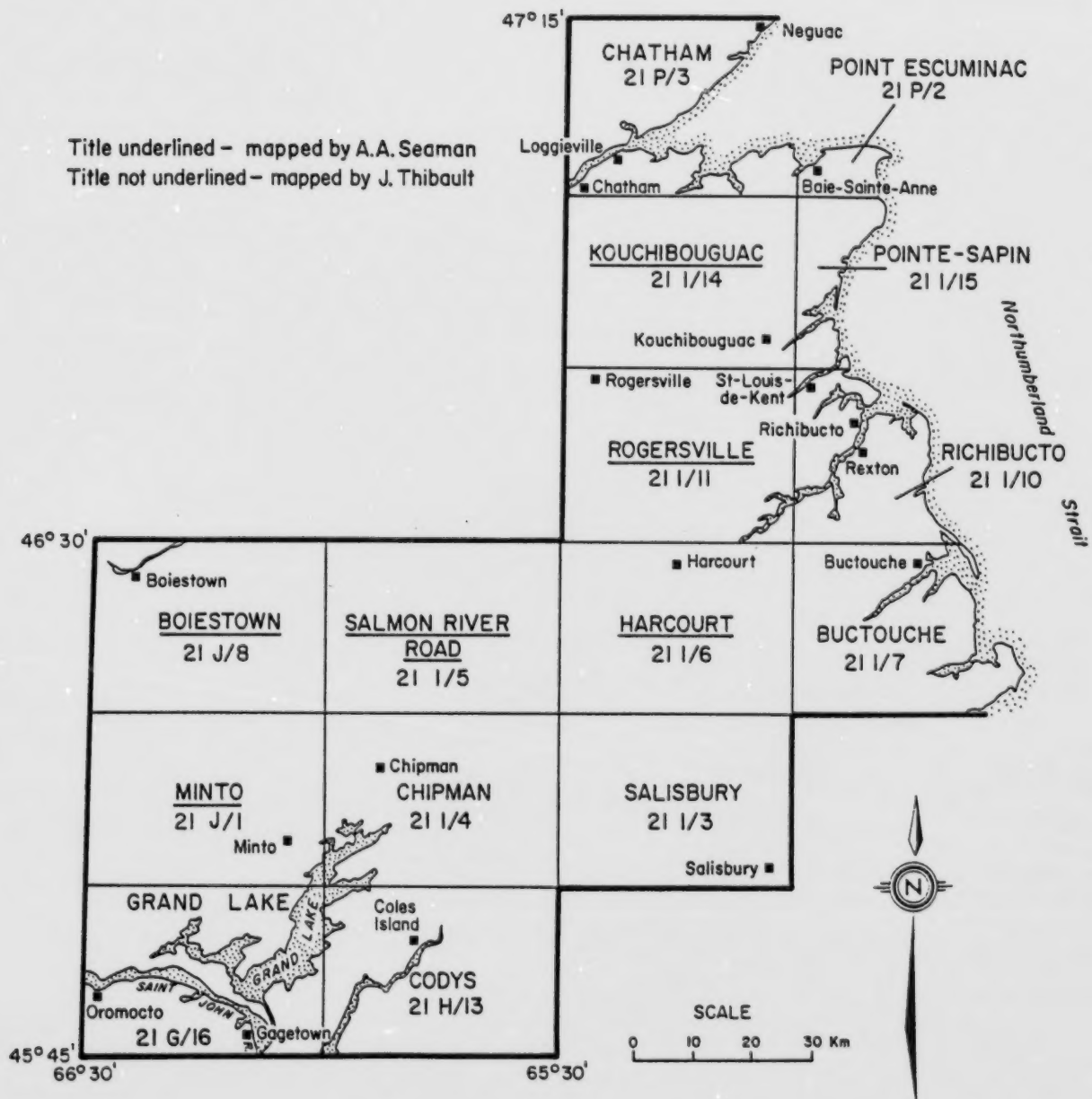


Figure 2. NTS 1:50 000 map sheets covering the study area

southern half of the Salisbury map area (Brinsmead 1974a, b), of part of the Richibucto map area (Kingston 1974a), and of the municipalities of Chatham (Seaman 1985a), Rexton (Davies and Seaman 1983), and Salisbury (Ruitenbergh and Thibault 1980) has been carried out at larger scales. The soil survey reports that cover most of the area provide limited information pertaining to surficial geology (Rees et al., in press; Stobbe 1940; Wang and Rees 1983).

Information pertaining to aggregates in the southern half of the Salisbury map area and part of the Richibucto map area was summarized by Kingston (1974b) and Chandra et al. (1975). In addition, Hamilton and Carroll (1975), in their preliminary survey of the aggregate resources of the province, provided information on a limited number of aggregate extraction sites within the study area.

THE PRESENT STUDY

The objective of this study is to provide basic information pertaining to the location, extent, thickness, and quality characteristics of the granular aggregate deposits in the Central Lowland area of New Brunswick. It is part of an on-going, province-wide inventory of granular aggregate resources.

In contrast to the detailed field studies of previous years, the mapping for this study was conducted at the reconnaissance level. There were two reasons for this; firstly, the regional surficial geology maps, mentioned above,

already identified the few major granular aggregate deposits in the area; and secondly, the aggregate in the area is known to be of generally poor quality.

Field work for the study was carried out during the summer of 1984. All driveable roads were surveyed, and all known accessible excavations were examined and described. Where warranted, the material was sampled for textural and lithologic analyses.

The Appendices contain descriptions of significant or representative sites, sample analyses from these locations, available test data from the New Brunswick Department of Transportation (DOT), general comments pertaining to the deposits as a whole, and estimates of the workable reserves.

ACKNOWLEDGEMENTS

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PHYSIOGRAPHY

PHYSIOGRAPHIC UNITS

Two-thirds of the study area lies within the Central Lowland subdivision of the New Brunswick Lowlands (Rampton et al. 1984), hence its inclusion in the title of this report. Other subdivisions of the New Brunswick Lowlands - a portion of the Maritime Plain (King 1972) - and elements of the Caledonian Highlands and the Miramichi Highlands occupy the remainder of the area (Figure 3). The brief summaries of these physiographic units that follow are based on the detailed comments of Rampton et al. (1984).

The New Brunswick Lowlands consist of a broad, relatively smooth plateau surface (Bird 1972). Four subdivisions of these Lowlands are present in the study area: Central Lowland, Acadian Peninsula, Grand Lake Basin and Nashwaak Hills. The Central Lowland subdivision consists of a broad, flat surface that slopes gently toward Northumberland Strait; as succinctly described by Chalmers (1895, p. 8), it is a "flat and uninteresting plain." Relief is low, except adjacent to the major streams that may be incised to a depth of 30 to 45 m below the surface of the plain. The Acadian Peninsula, lying to the north of the Miramichi River, is also an area of low relief, with a flat, eastward-sloping surface. The Grand Lake Basin subdivision is an area of generally flat to gently

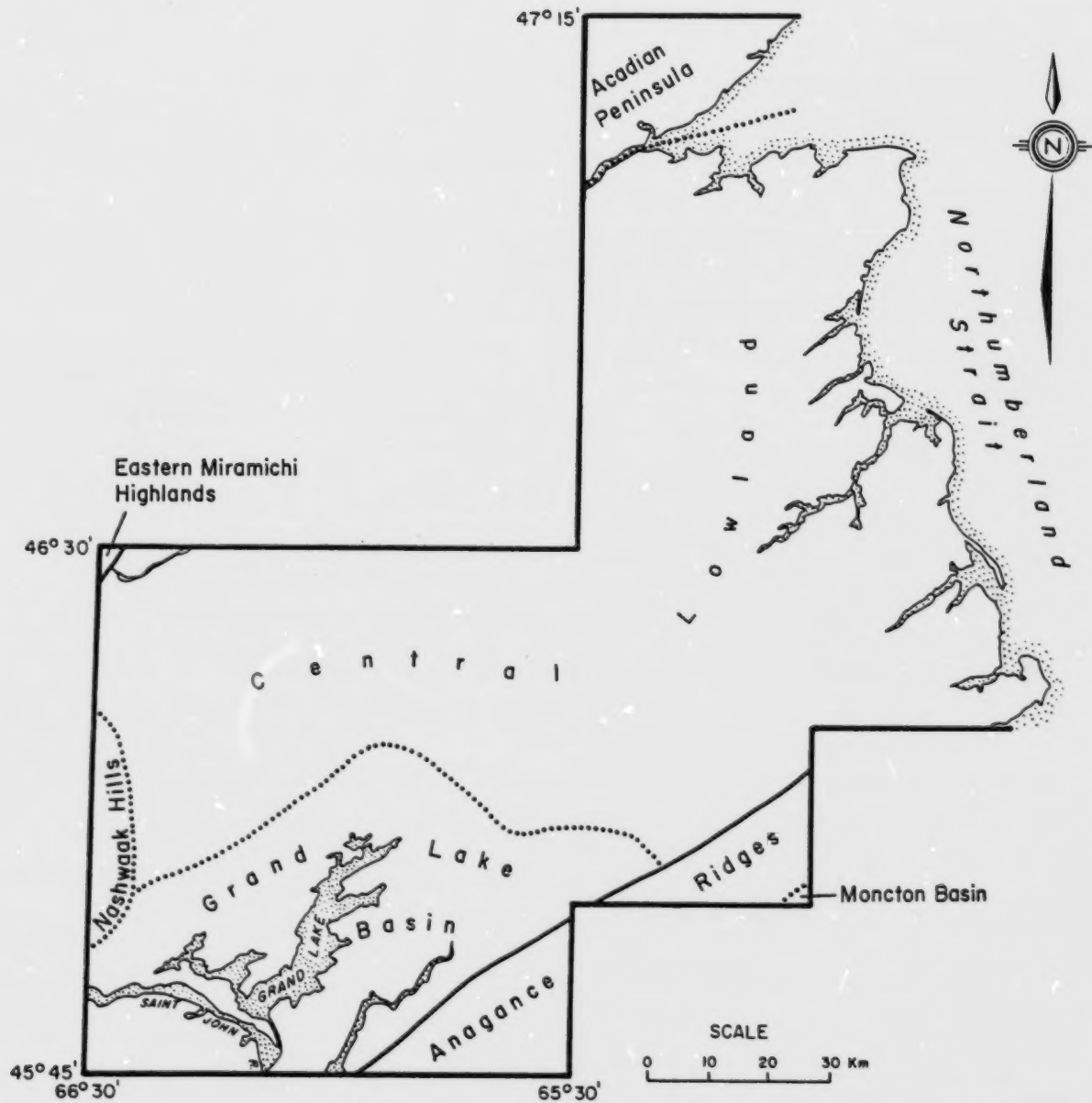


Figure 3. Physiographic units (after Rampton et al. 1984)

sloping topography wherein the land surface slopes toward Grand Lake. Local relief may be as great as 45 m. The Nashwaak Hills subdivision, in the western part of the area and bordering the Nashwaak River, consists of an undulating, upland surface with relief exceeding 60 m.

Elements of the Caledonian Highlands occupy significant portions of the Codys and Salisbury map areas. Two subdivisions are present: Anagance Ridges and Moncton Basin. The Anagance Ridges subdivision, occupying most of the southeastern portions of the above map areas, is an area exhibiting valley and ridge topography. These valleys and ridges, parallel to the regional structural trend, are responsible for the high relief of the area. The Moncton Basin subdivision occurs only in the extreme southeastern corner of the Salisbury map area. This is an area of flat to gently rolling topography formed by the broadening of one of the structural valleys.

A gently rolling topography transitional to the core of the Miramichi Highlands is a feature of the Eastern Miramichi Highlands subdivision within the Boiestown map area. Relief rarely exceeds 60 m.

DRAINAGE

Portions of four major drainage basins lie within the study area (Figure 4). The Miramichi drainage basin occupies the northwestern part of the area. It is drained by the Southwest

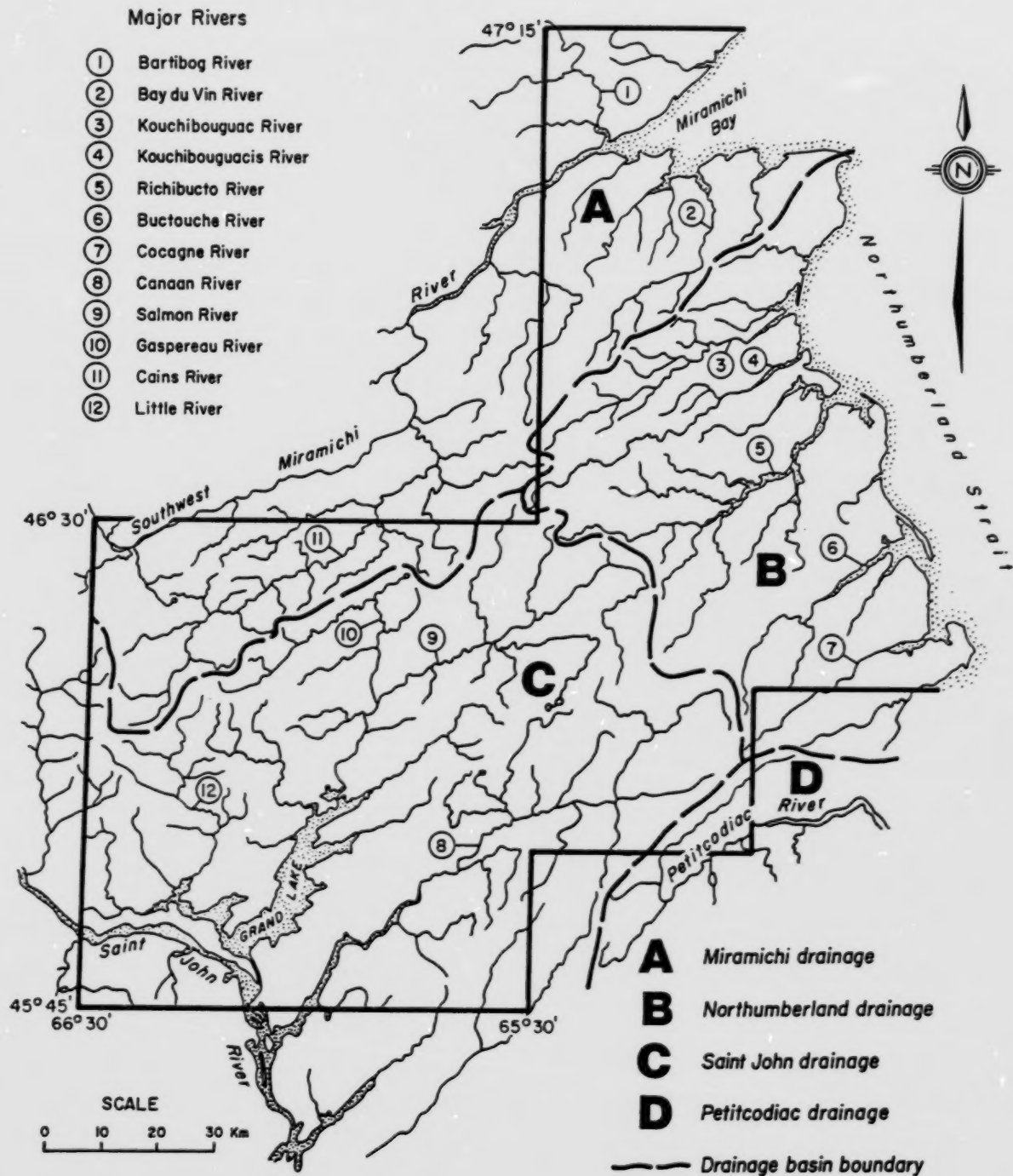


Figure 4. Drainage

Miramichi River and its tributaries, and by streams flowing into Miramichi Bay from both the north and south. In the eastern part of the area, the Northumberland drainage basin is drained by many small rivers that flow eastward into the Northumberland Strait. The Saint John drainage basin, in the southwest portion of the study area, is the largest and is drained by the Saint John River and its tributaries. The Petitcodiac drainage basin, in the southeast corner of the Salisbury map area, is drained by the Petitcodiac River and its tributaries. The latter two drainage basins empty into the Bay of Fundy.

Most of the major streams lie in valleys incised into the lowland surface (Rampton et al. 1984). As a consequence of the on-going rise in relative sea level, the lower courses of many of the streams are now drowned (Rampton and Paradis 1981b).

The drainage over most of the study area exhibits a marked rectilinear pattern with a northeastward trend, as Figure 4 clearly illustrates. This parallel alignment of the major streams reflects the orientation of the lowland basin and of the controlling structural trends (Rampton et al. 1984). Superimposed on this parallel pattern are the effects of glacial derangement. As a result of this derangement and the overall flat topography, drainage tends to be poor to fair (Rampton et al. 1984; Rampton and Paradis, 1981b), with widespread boggy areas. However, drainage is good adjacent to the major streams and in the more rugged areas of the Nashwaak Hills and the Anagance Ridges (Rampton et al. 1984).

GEOLOGY

BEDROCK GEOLOGY

The bedrock geology of the study area is summarized in Figure 5, based on the work of Ball et al. (1981) and Potter et al. (1979).

Clastic sediments of Carboniferous (Mississippian and Pennsylvanian) or younger age underlie most of the area. These rocks are generally flat-lying, with a gentle eastward dip, except in the area adjacent to the Caledonian Highlands, where they are gently folded (Poole and Rodgers 1972), and within the Highlands, where they are both folded and faulted (Ruitenberg and McCutcheon 1982). Grey to brown, locally reddish, sandstones are dominant at the surface, but grey to red shales, siltstones and conglomerates are also common.

Throughout much of the area, the Carboniferous sediments are weathered to a depth of several metres. In texture, the weathered rock varies from a rubble of blocks or slabs to a compact but disaggregated sand or sandy gravel. It is difficult to differentiate the weathered bedrock from sandy stony tills (Rampton and Paradis 1981b) unless a clean vertical exposure exhibits the bedding characteristics .

Chalmers (1895, 1898) and Gauthier (1983) indicated that the disintegration of the bedrock surface was due to preglacial weathering. However, Rampton and Paradis (1981b) have suggested that this may not be the case, and have postulated

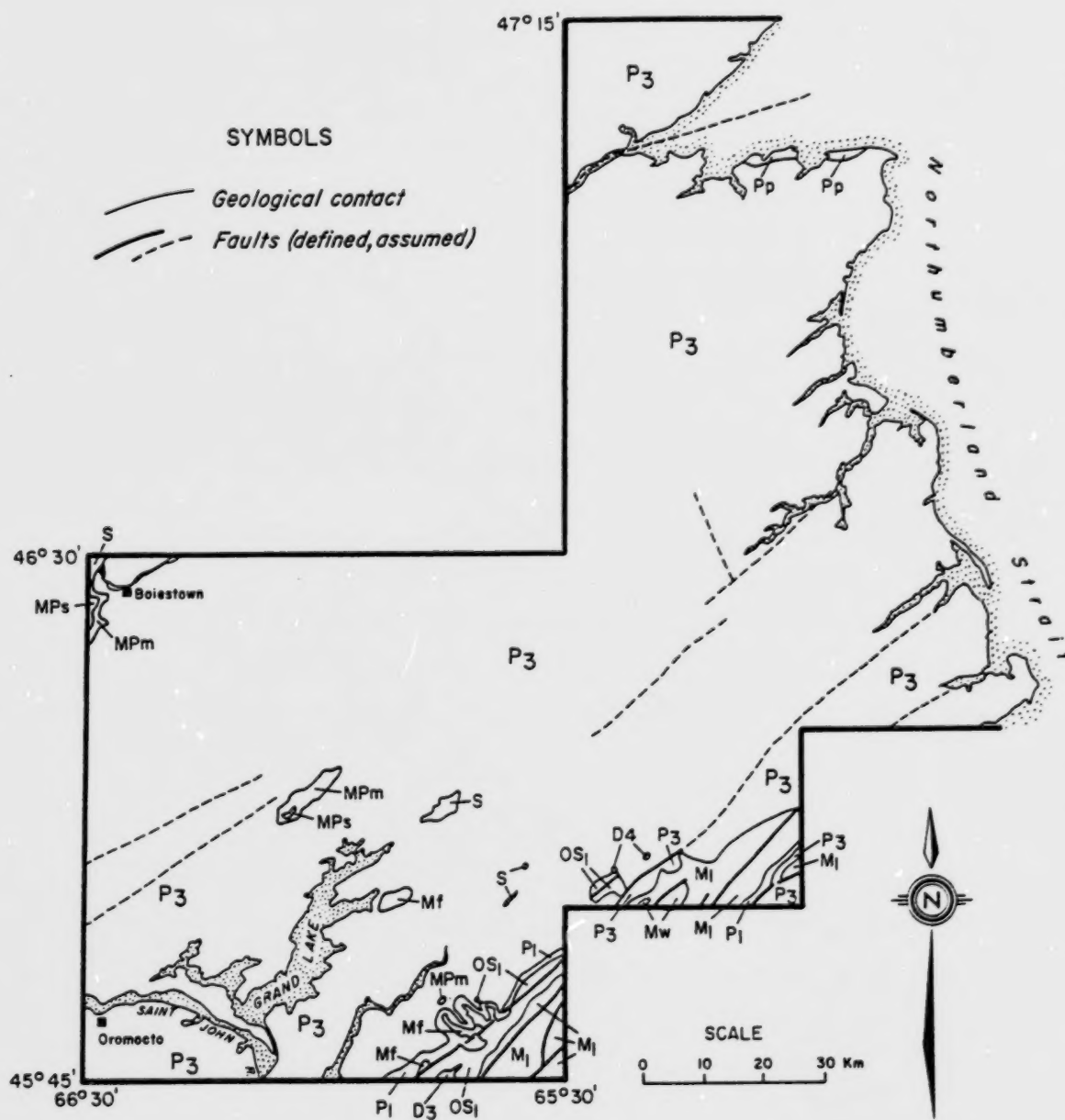


Figure 5. Bedrock geology (from Ball et al. 1981;
 Potter et al. 1979)

LEGEND

PERMIAN

Pp Red to grey shale, siltstone, sandstone and conglomerate

PENNSYLVANIAN and/or PERMIAN

P3 Red to grey sandstone, shale, siltstone and conglomerate; contains abundant plant fragments and scattered coal seams

P1 White to grey quartzose sandstone and quartz-pebble conglomerate

MISSISSIPPIAN and/or PENNSYLVANIAN

MPs Red shale, siltstone, sandstone and conglomerate

MPm Green to grey olivine basalt grading to andesite

MISSISSIPPIAN

M1 Red to grey sandstone, conglomerate, and shale

Mw Limestone, with gypsum, shale, and sandstone

Mf Felsic volcanics, tuffs

DEVONIAN

D4 Granite and related rocks

D3 Gabbro and related rocks

SILURIAN

S Greywacke, slate, phyllite, and foliated sandstone

ORDOVICIAN and/or SILURIAN

OS1 Quartzite, schist, argillaceous sedimentary rocks

possible glacial or postglacial mechanisms. The occurrence of deeply weathered profiles in granites and gabbros underlying unweathered tills in north-central New Brunswick (Seaman 1985b) and elsewhere, lends support to a preglacial age for the weathering.

Other rock types are present in the Caledonian Highlands, around the northern end of Grand Lake and in the northwest corner of the Boiestown map area. These include: mafic and felsic volcanic rocks, and various metasedimentary rocks, with fewer areas of gabbro, granite and limestone. The details are summarized in Figure 5.

QUATERNARY GEOLOGY

The predominant Quaternary unit within the study area is a blanket of till, of Late Wisconsinan age, which ranges from less than 0.5 m up to 3.0 m in thickness (Rampton et al. 1984). Observations indicate that average thicknesses are in the order of 0.5 to 1.0 m. This material is predominantly a brown to reddish brown, silty sand till. No glacial deposits of known pre-Late Wisconsinan age have been found in the area.

Observed striations, and those previously reported, indicate that the area was subject to complex interactions between ice flows from several sources. Rampton et al. (1984) have identified two major phases of Late Wisconsinan glaciation. During the Chignecto phase, approximately 15,000 to 18,000 years BP (Before Present), the area was affected by

the Gaspereau Ice Centre, located in the Central Lowland north of Grand Lake, and the Escuminac Ice Centre, located in the vicinity of northwestern Prince Edward Island. Ice from the Gaspereau Ice Centre flowed southward in the southwestern part of the area, and possibly toward the northeast in the northern and eastern parts. Ice from the Escuminac Ice Centre flowed southward down the east coast, south of the Miramichi River, and northwestward in the area to the north. Interplay between these two ice centres may have been, in part, the reason for the variety of striae orientations observed in the study area, which range clockwise from northwest to southwest.

The Chignecto phase was followed by the Bantalor phase, which terminated at approximately 13,000 years BP with the deglaciation of eastern New Brunswick. Ice from the Gaspereau Ice Centre dominated the area during this phase. Initially, the ice continued to flow southward in the southwestern part of the area, but flowed in an east-northeastward direction elsewhere in the area. Ice retreat began during the Bantalor phase, possibly due to calving into rising marine waters. The ice margin at this time was probably irregular due to a number of major reentrants. The best evidence for a possible reentrant is found in the Kouchibouguac River area. Three esker systems fed into the area: the Laketon esker system, to the north, flowed southward; the Despres Lake esker system, to the west of most of the study area, flowed eastward (Seaman

1983); while the Kent Lake esker system, to the south, flowed northward. Ablation moraines were formed perpendicular to the trends of the Despres Lake and Kent Lake eskers.

With the westward retreat of the ice through the area, the Gaspereau Ice Centre shifted to the west and the main ice flow was diverted toward the north-northeast. Subsequently, the Gaspereau Ice Centre degenerated into an ice divide comprising a number of separate domes. This resulted in variable ice-flow directions, such as the southwestward flow to the west of Minto, due to a remnant ice cap near Grand Lake. Ablation moraines were formed locally by pauses in the ice retreat, or by short-lived readvances (Rampton et al. 1984). The local occurrence of glaciofluvial deposits buried beneath tills in the Minto area and in the Salmon and Canaan River valleys, may relate to such readvances. However, due to the lack of chronological evidence, no definite age can be assigned to these glaciofluvial deposits; they could be of pre-Late Wisconsinan age.

Submergence in the study area occurred sometime during the Bantalor phase, probably near the beginning if the initial ice retreat was due to calving into rising marine waters. However, it is possible that submergence followed the initial deglaciation (Rampton and Paradis 1981b). The area remained submerged until well after the termination of the Bantalor phase since a whale bone found in marine clays at Saint-Louis-de-Kent has been dated at 12,600 $\pm$ 140 years BP

(GSC-3284; Rampton et al. 1984). Rampton and Paradis (1981b) and Rampton et al. (1984) propose that in this area the sea rose to a level greater than 100 m above current mean sea level. However, in this study, evidence for submergence above the 30 m level could not be found. The deposits flanking the Kent Lake esker at an elevation of 45 m, that were mapped as beach ridges by Rampton and Paradis (1981b), were found to consist of ablation till. These deposits are thus ablation moraines. No evidence for submergence of these deposits, in the form of overlying marine sediments or signs of wave-reworking, was found. Consequently, it appears unlikely that the sea was in contact with the retreating ice for most of the Bantalor phase, as suggested by Rampton et al. (1984), since most of the area lies well above the 30m level.

Subsequent to deglaciation of the area (and to submergence in those parts so affected), the newly exposed glacial deposits were exposed to physical and chemical weathering, and the initiation of soil development. Due to the numerous depressions in, and generally poor drainage of the area, numerous bogs of varying sizes developed. Pre-glacial valleys were reexcavated by the alluvial streams, with some new channels cut during the process. Recently, marine levels have begun to rise again, resulting in the flooding of the lower reaches of the rivers to form estuaries.

GRANULAR AGGREGATE RESOURCES

QUALITY ANALYSIS

The quality of a granular aggregate material is dependent upon two primary physical characteristics:

- 1) the grain size characteristics of the material, and
- 2) the lithologies of its component clasts.

Grain Size Characteristics:

The grain size characteristics of an aggregate are determined by passing a sample of the material through a nest of sieves (ASTM C136-76) and they apply specifically to the sample examined. Analysis of the collected samples was carried out by the N. B. Department of Transportation, using wet sieve analysis (ASTM C117-76) to accurately determine the silt/clay contents. The results of these mechanical analyses are tabulated in the Appendices.

The grain size characteristics of the material were also estimated in the field, on a qualitative basis, using the standard geological grain size classification outlined in Table I. The relative proportions of the major grain size classes within the materials are described in terms of the textural classification outlined in Table II. In addition, the terms "fine aggregate" and "coarse aggregate" are used, to identify material predominantly finer and predominantly coarser, respectively, than 4.75 mm (ASTM C125-76).

TABLE I

GRAIN SIZE CLASSIFICATION

(Classification modified after Friedman and Sanders, 1978)

Descriptive Size Category	Limiting Size (Minimum)	Approximate Equivalent In DOT Sieve Sizes (Not Passing)
Boulders	256 mm	-
Cobbles		
- large	128 mm	-
- small	64 mm	75 mm
Gravel		
- very coarse	32 mm	31.5 mm
- coarse	16 mm	19.0 mm
- medium	8 mm	9.5 mm
- fine	4 mm	4.75 mm
- very fine	2 mm	2.36 mm
Sand		
- very coarse	1 mm	1.18 mm
- coarse	500 μ m	600 μ m
- medium	250 μ m	300 μ m
- fine	125 μ m	150 μ m
- very fine	63 μ m	75 μ m
Silt and Clay (fines)	-	-

TABLE II

TEXTURAL CLASSIFICATION

(Modified from Folk, 1968)

% Passing 2.35 mm (Approximate Range)

Gravel	0 - 20
Sandy Gravel	20 - 70
Gravelly Sand	70 - 95
Sand	95 - 100

% Passing 75 μ m (Approximate)

Silty	10
Slightly Silty	5 - 10

Lithologic Characteristics:

The composition of the clasts within an aggregate deposit has a significant effect on the quality of the material. Preferably, clasts should exhibit three primary characteristics: a) they should be of good physical quality, b) they should be uncoated, and c) they should not react with any cementing materials.

To determine the lithologic characteristics of a deposit, a sample of approximately 100 pebbles in the 25 to 75 mm size range was collected from a fresh exposure. The lithologies represented by the clasts were determined, and they were divided into two groups, sound and unsound. The two groups are differentiated primarily on the basis of the resistance of the clasts to disintegration under mechanical impact (with the exception of chert, which exhibits chemical instability in concrete). The results of this test should not be confused with those from quantitative soundness tests (e.g., the magnesium sulphate test), or those from abrasion tests (e.g., the Los Angeles abrasion loss test used by the N. B. Department of Transportation).

The results of the above qualitative soundness tests, plus any quantitative test results available from DOT, are tabulated in the Appendices.

QUALITY LIMITATIONS

There are five major factors which serve to degrade the quality of an aggregate; two relate to texture, and three to clast lithology. These are: 1) an excessive fine particle content; 2) poor grading; 3) poor physical quality of clasts; 4) coatings on clasts; and 5) reactive character of clasts (i.e., alkali-reactivity in cement).

Fine Particle Content:

A content of fine particulate matter (that material passing through a 75 μm sieve) in excess of five percent in an aggregate is generally considered deleterious, and for some usages, even lower percentages are specified (Bates 1969).

Fine particles may occur as discrete beds within a deposit, as coatings on larger clasts, as disseminated particles throughout a deposit, or as some combination of the above. If an aggregate contains fines in excess of the specified limits for a particular use, it may be upgraded to an acceptable level by washing, with an attendant significant increase in the cost of exploitation. However, in the first case above, this may be avoided by selective extraction of material.

Grading:

Grading refers to the particle size distribution within the aggregate (i.e., the relative proportions of material in the different size categories). The natural grading of a deposit

may be improved by crushing, by selective screening and recombination, or by the combination of materials from different sources or areas. However, such processing increases production costs. Excessive variability in the grading of a deposit can also lead to production problems.

Grading limits are specified by users (e.g., DOT), and will vary, depending upon the use of material. Poor grading may restrict the potential of some deposits for certain uses.

Physical Quality:

Ideally, clasts should be hard, strong, and durable. Soft materials such as shale, schist, and friable sandstones are unsuitable for use in most aggregates, since they disintegrate easily, while porous or fractured rock fragments may split due to the expansion of water as it freezes (Bates 1969).

Poor physical quality is the most significant quality-limiting factor of the coarse aggregate in the study area, since most of the clasts in the deposits consist of the soft and highly porous Carboniferous sandstone. The presence of coal fragments in some of the fine aggregates also has a deleterious effect, unless removed by processing.

Clast Coatings:

The presence of silt, clay, carbonate, or oxide coatings on clasts renders them unsuitable for use in high-specification aggregate, since they weaken the bond between the clast and the

cementing agent, and in concrete may become chemically unstable (Bates 1969). Silt and clay coatings may be removed by washing, with a consequent increase in the cost of exploitation.

Manganese oxide coatings on clasts are prevalent in the study area. Iron oxide coatings have also been observed.

Alkali-reactivity:

Clasts that consist of opaline or cryptocrystalline silica react with the alkalies in cement. As a result of this reaction, the clasts expand, producing cracks within the concrete and making it susceptible to freeze-thaw and other destructive processes. The primary offenders are chert and some felsic extrusives (Bates 1969). In cases of suspected reactivity, the use of low-alkali portland cement or partial substitution of a pozzolanic material - such as fly-ash or finely ground siliceous material - for some of the cement is recommended (Bates 1969; Swenson 1973).

Chert does not appear to be overly abundant in the study area. However, the content of felsic extrusive clasts is high in some deposits in the Codys and Salisbury map areas, and moderate in some deposits in the Chatham map area. Considering the above recommendations, the assumption should be made that these felsic extrusives are reactive, until proven otherwise.

DESCRIPTION OF MAP UNITS

The major granular aggregate resources of the study area are found in deposits of five basic types. These are: 1) ablation till; 2) ice-contact stratified drift; 3) glaciofluvial outwash; 4) shallow-water marine deposits; and 5) alluvium. A general description of each of these deposit types is presented below.

Ablation Till:

Ablation till comprises the material that was carried into the terminal zone of a melting glacier by transport within or upon the ice, and then deposited onto the ground by means of sliding, flowing, or subsidence (Flint 1971). "The resulting till is therefore loose, noncompact, and nonfissile, and its clasts are less strongly abraded than those in lodgement till" (Flint 1971; p. 171). Ablation till deposits may take on a variety of topographic forms, with surfaces ranging from flat through hummocky to ridged. Such deposits may range in size from small, isolated occurrences surrounded by lodgement till or bedrock, to extensive areas covering many square kilometres.

Typically, ablation till exhibits very poor sorting, generally containing the entire grain size range from clay through to boulders. Excessive quantities of both boulders, and silt and clay are present in many of these tills.

Ablation till deposits have only been mapped if they display significant relief, or if they are closely associated with glaciofluvial materials. Most of the ablation till deposits in the study area have relatively low relief and are generally interspersed with bogs. In addition, the physical quality of the material is very poor, akin to that of the combination of weathered sandstone and till which is so readily available throughout the area. Thus, with the exceptions noted above, the ablation till deposits in this area are not considered to be significant aggregate resources.

Ice-Contact Stratified Drift:

Ice-contact stratified drift deposits are those deposits of glaciofluvial origin that are formed of sediment deposited by meltwater on or against glacial ice. Characteristically, such deposits form distinctive constructional landforms of various types.

Eskers are linear accumulations of sediment formed either by deposition from meltwater streams flowing in tunnels within a melting glacier (Flint 1971), or by deposition of a series of overlapping fans or "beads" at the point of stream discharge from a retreating glacier (Embleton and King 1975). Kames are mound-like hills, ranging from conical to irregular, formed from sediment that was washed into crevasses or other openings or depressions in the glacier surface and remained as mounds after the ice melted away; crevasse fillings are features of

similar origin that occur as short ridges (Flint 1971). Kame terraces consist of linear accumulations of sediment deposited by meltwater between an ice margin and a valley wall (Sugden and John 1976). Finally, kame complexes are hilly areas comprising numerous kames (Price 1973), usually in association with other materials such as glaciofluvial outwash.

In general, ice-contact stratified drift deposits consist primarily of sand and gravel, with variable quantities of clay, silt, cobbles and boulders. The sorting can vary from very poor to good, while the texture commonly exhibits abrupt lateral and vertical variations. Such deposits, due to their deposition in contact with glacial ice, commonly display postdepositional deformation structures as a result of slumping subsequent to ice withdrawal. Because of their close association with the glacier, pockets of ablation or lodgement till may be present.

Glaciofluvial Outwash:

Glaciofluvial outwash comprises the material that is deposited beyond the margins of a glacier by the action of meltwater streams. In general, this material consists of well-washed, horizontally stratified sand or gravel. Glaciofluvial outwash deposits usually exhibit a flat, gently sloping topography. However, the meltwater streams that form these deposits may transport, and deposit, blocks of ice in

addition to their regular sediment load. The melting-out of buried ice blocks within the outwash deposits results in the formation of small circular to irregular depressions in their surfaces referred to as kettle holes (Flint 1971).

Due to the flat topography throughout much of the study area, the horizontal extent of most of the outwash deposits could not be accurately delineated. To do so would require detailed test pitting. Consequently, the boundaries of such deposits and their areas must be considered indefinite.

Shallow-Water Marine Deposits:

Shallow-water marine deposits were generated by the action of waves in coastal areas during the interval of late-glacial submergence. These deposits typically occur as thin blankets of sand and gravelly sand, or sometimes gravel, rarely exceeding one metre in thickness and commonly overlying a weathered bedrock surface.

Only those deposits which exhibit significant accumulations of sand or gravel have been mapped. They usually occur in close association with glaciofluvial deposits. The inland extent of the limit of significant marine wave-washing, according to Rampton and Paradis (1981b) and Rampton et al. (1984), has been outlined on the maps of coastal areas. The areas below this limit are those in which local occurrences of thin shallow-water marine deposits may be found.

Alluvium, Ancient and Modern:

Alluvium consists of unconsolidated material that was deposited by the flowing water of streams or rivers during the postglacial period. Characteristically, the material consists of horizontally stratified sand or gravel, although it may also contain a significant silt component (usually in the form of discrete beds, commonly at the surface of the deposit).

Modern alluvium is the material that forms the modern floodplains of the rivers, and is subject to periodic flooding. Within the study area, most of these deposits have very shallow water tables. Only in those instances where there appears to be a reasonable thickness of workable material are these deposits mapped.

Ancient alluvium includes the material of fluvial origin that was deposited subsequent to deglaciation, but now lies above the level of modern alluvial activity (except in the case of rare, extreme floods). The deposits occur as terraces along the river valleys but at elevations lower than those of any outwash deposits that may be present.

GRANULAR AGGREGATE SOURCES

Grand Lake (21 G/16):

The Grand Lake map area (Plate 85-30; Appendix A) is dominated by the presence of the wide alluvial plain of the Saint John River. This area has limited potential as a source

of granular aggregate since it is characterized by a shallow water table. However, it does have a high agricultural potential.

The only major source of granular aggregate is found within the ice-contact complex lying between Upper Gagetown and Coytown (G16-9, 10). This deposit has been intensively worked and is rapidly nearing depletion.

Material has been extracted from beaches in the past (e.g., Grand Point Bar near Douglas Harbour), however, usage of shoreline sand and gravel should continue to be discouraged due to its negative impact on coastal stability.

Codys (21 H/13):

Reserves of granular aggregate material in the Codys map area (Plate 85-31; Appendix B) are estimated at approximately two million m³. The bulk of this material is found in the Millstream River valley (H13-4, 5, 6, 7, 8, 9) and consists of texturally variable glaciofluvial material.

A belt of ablation till, in the form of low ridges, occurs north of the Trans-Canada Highway, between Rees (a community located in the northwest corner of the map sheet) and Kelly Brook. These ridges are composed of poorly sorted material that is suitable only as a source of fill. Another zone of ridged moraine is present in the headwaters of South Branch Miller Brook and Northeast Branch Long Creek.

East of Phillipstown along the Canaan River, a wide and low terrace was interpreted by Rampton et al. (1984) as a sandy marine blanket. While more exploratory work is necessary to fully assess the potential of the deposit, field observations suggest that the presence of a shallow water table would limit the extraction depth.

Salisbury (21 I/3):

Reserves of granular aggregate material in the Salisbury map area (Plate 85-32; Appendix C) are estimated at about two million m³, most being found in a glaciofluvial (in part alluvial?) deposit southeast of New Canaan (I3-1). Shallow workable depths severely limit the extraction potential of this deposit.

Large volumes of poor quality material are present within the Catamount and New Canaan moraines. Exposures are few in number and usually display ablation till. However, glaciofluvial material is locally present (I3-3, 4). Detailed investigations are needed to further assess this potential source of granular aggregate.

An esker and outwash complex along Blakney Brook (just south of sample location I3-5) is nearing depletion.

Chipman (21 I/4):

Reserves of granular aggregate material in the Chipman map area (Plate 85-33; Appendix D) are limited, and are found principally as sandy alluvium in the Salmon River valley (I4-1, 2), and as glaciofluvial (I4-4, 5, 6) and morainic deposits in the vicinity of Cherryvale.

Detailed subsurface exploration in selected areas may reveal buried granular aggregate deposits since field observations show that till locally overlies sand and gravel.

Salmon River Road (21 I/5):

The major source of granular aggregate material in the Salmon River Road map area (Plate 85-34; Appendix E) is the Salmon River esker (I5-4, 6). This large segmented deposit has estimated reserves in excess of 26 million m^3 . The material is highly variable in texture, ranging from fine to medium sand through to coarse cobble gravel. The coarse aggregate appears to be of mainly poor quality, though some material of fair quality may be locally present; the fine aggregate varies from poor to good.

A small, heavily pitted deposit of glaciofluvial outwash is present along the Gaspereau River at Upper Gaspereau (I5-3). This deposit, with estimated reserves of 150,000 m^3 , consists mainly of very poor to poor quality coarse aggregate. Similar material is found in several minor deposits in the map area.

Harcourt (21 I/6):

Major granular aggregate deposits have not been found within the Harcourt map area (Plate 85-35; Appendix F). There are a few minor deposits that contain small amounts of very poor quality coarse aggregate. Two exceptions are: the small alluvial deposit along the Salmon River (I6-2), that contains a limited quantity of good quality fine aggregate, and the alluvial deposit at Fords Mills, on the Coal Branch River, that contains some fine aggregate.

Buctouche (21 I/7):

Reserves of granular aggregate material in the Buctouche map area (Plate 85-36; Appendix G) are very limited. Almost all excavations expose bedrock; either in section, or on the pit floor. A ubiquitous blanket of marine sand is present in the coastal zone. The littoral sand dunes and barrier beaches have not been considered as a source of granular aggregate since any exploitation of these landforms would have detrimental effects on a shore that already experiences a high natural rate of erosion.

Richibucto (21 I/10):

Reserves of granular aggregate material in the Richibucto map area (Plate 85-37; Appendix H) are estimated at about 300,000 m³, most being found in a glaciofluvial deposit southeast of Saint-Charles (I10-3, 4). The quality of the

coarse aggregate is commonly marginal because of the high component of local sandstone. More competent granular material has to be imported and blended with the local material to meet high-specification requirements.

A zone 2 to 10 km wide, extending inland from the shore, is typically overlain by a blanket of shallow marine sand that was deposited during the transgression episode following deglaciation. This sand blanket is thin and usually rests on till or weathered bedrock. Locally, as in the upper reach of the Petite Aldouane River, thicker sand deposits occupy ancient valleys.

Rogersville (21 I/11):

The granular aggregate material in the Rogersville map area (Plate 85-3; Appendix I) consists mainly of very poor quality coarse aggregate. In most cases, greater than 90 percent of the component clasts are of the soft local sandstone. An exception is the small ice-contact deposit at Young Ridge (Ill-1) that contains a limited quantity of fair to good quality coarse aggregate. Sand of fair to good quality is found in some deposits. However, in those deposits consisting mainly of sand (Ill-4, 7), the material generally contains an excessive amount of silt.

Most of the material in the area is associated with a discontinuous esker system that extends northward from the Richibucto River to the Kouchibouguacis River (Ill-9, 10, 11).

Reserves are estimated at 2.7 million m³. The other major deposits in the area are the outwash terraces along the Kouchibouguac River (Ill-3, 5), with estimated reserves of greater than one half million m³.

Kouchibouguac (21 I/14):

The Kouchibouguac map area (Plate 85-39; Appendix J) contains an estimated volume of granular aggregate material in excess of 4 million m³. Most of this material is distributed between outwash deposits in the upper reaches of the Barnaby, Bay du Vin, and Little Black rivers, and in ice-contact deposits northeast of St. Margarets and southeast of Laketon.

Coarse aggregate is dominant in these deposits, and as expected, is of poor quality. Testing by DOT indicates that the materials generally have a Los Angeles abrasion loss in excess of 50 percent. In most cases, more than 70 percent of the clasts in the materials consist of the soft local sandstone. The fine aggregate varies from poor to good.

Pointe-Sapin (21 I/15):

The Pointe-Sapin map area (Plate 85-40; Appendix K) contains no significant sources of granular aggregate. Extensive peatlands have developed over the flat landscape. The coastal sand dunes and barrier islands have not been considered as a source of aggregate because any exploitation of these landforms would have detrimental effects on the coastal zone.

The majority of the pits present are shallow and are excavated into weathered sandstone bedrock. A ubiquitous blanket of sand, 0.5 to 3.0 m thick, covers most of the map area and results from the marine transgression that followed deglaciation.

Minto (21 J/1):

In the Minto map area (Plate 85-41; Appendix L), only a small amount of granular aggregate material occurs; fortuitously, it is present near the Village of Minto. To the east of the village, an ancient alluvial deposit (probably formed marginal to a marine or lacustrine environment) contains an estimated 350,000 m³ of predominantly fine aggregate, commonly silty (J1-1). To the west of the village, a deposit of fair to good quality coarse aggregate, with some fine aggregate, is present (J1-2). Since this deposit is overlain by till, its true extent cannot be determined without exploratory drilling or test pitting. Despite residential development over part of its probable area, the deposit may still contain a significant volume of workable material.

Boiestown (21 J/8):

Most of the granular aggregate resources of the Boiestown map area (Plate 85-42; Appendix M) are concentrated along the Southwest Miramichi River valley in alluvial and outwash

terraces. The material is of fair to very good quality, with coarse aggregate being dominant. Total workable reserves are estimated to be greater than 7.5 million m³.

Two other significant deposits are known in the area. A kame terrace to the north of Porter Brook (J8-1) consists of a very poor quality, slaty, coarse aggregate. It is estimated to contain 300,000 m³ of reserves. A small outwash deposit along the Cains River (J8-6) consists of a mixture of poor quality coarse aggregate and good quality fine aggregate. It has estimated reserves of 160,000 m³.

Point Escuminac (21 P/2):

The only potentially significant source of granular aggregate within the Point Escuminac map area (Plate 85-43) consists of a large raised spit complex located along Highway 117, southeast of Escuminac. Excavation depths are limited by a shallow water table. Coastal features such as barrier islands (e.g., Fox Island) and sand dunes (e.g., Preston Beach) have not been considered as sources of aggregate since any exploitation of those landforms would have detrimental effects on the coastal zone.

A ubiquitous marine blanket occurs over most of the area that is not occupied by peatlands. The majority of the borrow pits display a thin layer of sand grading into a sandy till or weathered sandstone bedrock. Most of the pits are floored by fresh bedrock.

Chatham (21 P/3):

Reserves of granular aggregate material in the Chatham map area (Plate 85-44; Appendix N) are estimated to be about one million m³, most being found in two deposits: at Burnt Church (P3-6, 7) and east of the Oyster River (P3-4). The major deposits probably represent marine-reworked glaciofluvial landforms.

Below the limit of postglacial marine submergence, it is common to find a 0.5 to 1.5 m thick blanket of sand and pebble gravel overlying the weathered sandstone bedrock surface. Numerous borrow pits along Highway 11 display this relationship. Where the sandy marine blanket is thicker (P3-12), a shallow water table typically limits the extraction depth.

The gravel fraction in the majority of deposits contains a relatively high proportion of resistant igneous and metamorphic rock types that originated in the Miramichi Highlands to the west of the map area.

OTHER SOURCES OF AGGREGATE

A major source of borrow material is found in the weathered and shattered sandstones and conglomerates that are virtually ubiquitous throughout the study area. This material is of poor quality, with Los Angeles abrasion losses usually exceeding 80 percent (D. Manzer, DOT, personal communication). However, it has seen widespread use, due to the lack of better quality

material in the area. In combination with the thin overlying till, workable thicknesses in the order of 1.5 to 3.0 m are generally available using conventional excavation equipment (perhaps aided by a ripper), though thicknesses of up to 8.0 m have been noted.

Quarries have been developed in the mafic volcanics north of Minto and in the felsic volcanics east of Grand Lake. Both of these materials are superior to the sandstone in quality. A quarry has also been developed in shales to the northeast of Chipman. This material is used in the manufacturing of brick and tile.

In a few areas where the till thickness exceeds 1.0 m, pits have been developed that do not extend into bedrock. This till has been used predominantly as borrow material in the construction of logging roads.

CONCLUSIONS

The Central Lowland area is characterized by a general paucity of granular aggregate material. Total known workable reserves in the fifteen map areas are estimated to be in excess of 49 million m³. However, of these, over half are concentrated in the Salmon River esker system. In addition, significant volumes of material could be present in buried deposits since three have been discovered in the west-central part of the study area.

Most of the granular aggregate materials in the area consist of poor to very poor quality coarse aggregate, containing an abundance of soft sandstone clasts. Significant exceptions to the above are found in only two areas: along the Southwest Miramichi River valley in the Boiestown map area and along the Canaan River valley in the Salisbury map area. These two areas contain reserves of fair to good quality, predominantly coarse aggregate in excess of 7.5 million m³ and 2 million m³, respectively. Fine aggregate, varying from poor to good in quality, is found locally throughout the study area.

In addition to the above reserves, immense quantities of borrow material occur in the ablation till deposits scattered throughout the area and in the widely distributed weathered sandstones.

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APPENDIX A

SITE DESCRIPTIONS
GRAND LAKE MAP AREA

21 G/16

LOCATION #: G16-1
Type of Deposit: Outwash
Exposure Type: Pit
Status: Inactive

NTS: 21 G/16
County: Sunbury
Parish: Sheffield
UTM: 089 954

SECTION DESCRIPTION & COMMENTS:

A small pit has been opened in an outwash deposit, probably deltaic in origin. At least 3 m of sand is locally present, but the water table depth is about 2 m. The deposit apparently overlies till.

Other similar deposits occur in the general area and close to the 50 m contour elevation. All these deposits are relatively shallow and of limited extent. They are thought to represent outwash deltas grading to a higher sea (lacustrine?) level. The extraction potential of all these deposits is limited by their shallow nature, small surface area, and proximity of the water table.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing			100.0	99.8	99.6	99.2	94.9	42.7	3.4	0.2

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #:	G16-2	NTS:	21 G/16
Type of Deposit:	Alluvium	County:	Sunbury
Exposure Type:	Pit	Parish:	Sheffield
Status:	Active on demand	UTM:	140 947

SECTION DESCRIPTION & COMMENTS:

Pit faces average 2 m in height, the maximum is 2.5 m. Augering indicates the presence of at least 1.5 m of sand below the pit floor.

A 1 m section displayed well-stratified and well-sorted sand over contorted sand beds, oxidized sand and reddish brown silt. Flame structures were also noted.

A high water table limits the extraction potential of the deposit.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing							100.0	92.7	37.3	8.1

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
51	8	2	160,000

LOCATION #:	G16-3	NTS:	21 G/16
Type of Deposit:	Marine	County:	Queens
Exposure Type:	Pit	Parish:	Canning
Status:	Active on demand	UTM:	256 936

SECTION DESCRIPTION & COMMENTS:

A shallow pit has been opened in a near-shore marine (lacustrine?) deposit consisting mainly of loose, fine pebble gravel and sand. The thickness of the material does not generally exceed 2 m and shale and conglomerate bedrock outcrops are common. The southeast face of the pit exposes 2 m of poorly consolidated bedrock.

About 400 m north of this locality, a long (1,100 m) and narrow pit extends southeasterly across the Pond Stream Road. The pit is now abandoned but was tested by DOT in 1960. Samples collected showed 4.5% and 4.9% of material passing the 75 µm sieve and a Los Angeles abrasion loss of 37.8%. Overgrown sections in the pit are less than 2 m high and flooding in parts of the pit indicate the presence of till or bedrock at shallow depths. The deposit is interpreted as a beach strandline.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: G16-4
Type of Deposit: Marine/Bedrock
Exposure Type: Pits
Status: Abandoned

NTS: 21 G/16
County: Sunbury
Parish: Sheffield
UTM: 123 889

SECTION DESCRIPTION & COMMENTS:

A series of abandoned shallow pits expose 1 to 2 m high sections displaying a sandy pebble gravel overlying a poorly consolidated sandstone and conglomerate bedrock surface. DOT (1960) tested the material and obtained the following results:

Percentage finer than 75 μ m: range 1.2 to 7.3%; mode 4.7%
Los Angeles abrasion loss: range 23.8 to 30.5%

One excavation, 500 m northwest of this locality, exhibits vertical faces measuring up to 8 m in height, that cut poorly consolidated sandstone, conglomerate, and shale.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
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LOCATION #: G16-5
Type of Deposit: Bedrock(?)
Exposure Type: Pit
Status: Inactive

NTS: 21 G/16
County: Sunbury
Parish: Sheffield
UTM: 133 889

SECTION DESCRIPTION & COMMENTS:

This site was not visited during the course of the present survey. DOT (1972) data indicates that the material extracted from this location had a Los Angeles abrasion loss of 30.9% and that 1.5 to 2.8% of the material was finer than 75 μ m. The material was recommended as borrow and pit run subbase.

The bedrock that occurs in the general area is poorly consolidated and several local quarries have been in operation. A veneer of shallow marine (lacustrine?) gravelly sand commonly overlies the bedrock up to elevations of about 50 m.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES: N/A

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable

LOCATION #: G16-6
Type of Deposit: Marine/Bedrock
Exposure Type: Pit
Status: Abandoned

NTS: 21 G/16
County: Sunbury
Parish: Sheffield
UTM: 129 869

SECTION DESCRIPTION & COMMENTS:

A shallow pit exposes 1 to 2 m of dirty, sandy, fine gravel and sand. The percentage of material passing the 75 μ m sieve ranges from 3.2 to 5.1% (DOT, 1972).

Approximately 800 m northeast of this locality, poorly consolidated bedrock was extracted from a shallow pit and used as a source of borrow material.

The origin of the sand and gravel that blankets the poorly consolidated bedrock in the area is probably related to the marine (lacustrine?) transgression that followed deglaciation.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Limited

LOCATION #:	G16-7	NTS:	21 G/16
Type of Deposit:	Marine	County:	Queens
Exposure Type:	Pit	Parish:	Canning
Status:	Active on demand	UTM:	206 866

SECTION DESCRIPTION & COMMENTS:

2.0 m Gravel: Horizontally bedded sand and pebble gravel.

2.0 m Bedrock: Loose, poorly consolidated pebble conglomerate.

Other small pits have been opened in a thin, beach deposit that flanks a bedrock ridge.

DOT (1963) sampled the material and obtained the following results:

Percentage finer than 75 μ m: range 1.9 to 5.2%
 Los Angeles abrasion loss: 37.2%
 Recommended usage: borrow material

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Limited

LOCATION #:	G16-8	NTS:	21 G/16
Type of Deposit:	Marine(?)	County:	Sunbury
Exposure Type:	Pits	Parish:	Burton
Status:	Abandoned	UTM:	034 819

SECTION DESCRIPTION & COMMENTS:

Several shallow borrow pits occur in an area mapped by Gadd (1973) as a morainic terrain. Exposures show material consisting of moderately sorted sand and gravel, locally overlying till or bedrock. Sections range from 1.5 to 3.0 m in height and bedrock is probably present at relatively shallow depth. DOT (1961, 1969) tested the material in the general area and obtained the following results:

Percentage finer than 75 μ m: range 2.7 to 4.9%; mode 4.6%
 Los Angeles abrasion loss: range 46.3 to 55.7%

South of the CN railway, in CFB Galetown, a ridged landscape may be morainic in origin. However, the material found in the area between Lower Burton and the railway does not reflect such an origin. The sand and gravel probably originated from the action of waves during the transgression that followed deglaciation.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Limited

LOCATION #: G16-9
Type of Deposit: Ice-contact
Exposure Type: Pit
Status: Abandoned

NTS: 21 G/16
County: Queens
Parish: Gagetown
UTM: 132 810

SECTION DESCRIPTION & COMMENTS:

DOT (1972) sampled the material and obtained the following results:

Percentage finer than 75 μ m: range 3.2 to 11.0%; mode 7.6%
Los Angeles abrasion loss: range 29.9 to 37.4%
Recommended usage: borrow, subbase and borderline base course aggregate

Clay or silt was commonly encountered at depths ranging from 0.5 to 3.0 m. Up to 4.3 m of poorly sorted medium gravel was noted.

An extensive deposit of probable ice-contact origin overlies an irregular bedrock surface and extends from Swan Creek to Dingee Point, north of Gagetown. The extraction potential is moderate to good in the Coytown area.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Limited

LOCATION #:	G16-10	NTS:	21 G/16
Type of Deposit:	Ice-contact	County:	Queens
Exposure Type:	Pit	Parish:	Gagetown
Status:	Active on demand	UTM:	157 791

SECTION DESCRIPTION & COMMENTS:

A number of pits have been opened in a glaciofluvial deposit between Swan Creek and Grimross Canal. Material exposed at this locality consists of 2 to 4 m high sections of well-sorted sand and gravel. DOT (1973) sampled the material in the general area and obtained the following results:

Percentage finer than 75 μ m:	range 0.6 to 1.2%; mode 0.8%
Los Angeles abrasion loss:	range 24.8 to 25.9%
Recommended usage:	borrow, subbase, crushed (32 mm) base course aggregate and blending or filter sand

About 300 m southwest of this locality, testing by DOT (1973) indicated that the water table was shallow and was commonly intersected at depths ranging from 0.5 to 3.0 m. Silt and clay commonly underlie the sand and gravel at depths ranging from 1.5 to 2.5 m and in one place, bedrock was encountered at 1.5 m depth. These results suggest that although the deposit is significantly thick along the south valley slope, it thins rapidly once out of the valley. Bedrock was showing under 1 m of gravel, about 700 m east of this locality, along Highway 102.

During this survey, another pit was actively worked about 1 km east of this locality. Pit faces displayed 2 to 3 m beds of moderately well sorted sand and sandy
(CONTINUED)

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m^3)
			probable
			Moderate

LOCATION #: G16-10 (Continued)

SECTION DESCRIPTION & COMMENTS:

pebble gravel. Red clay (till?) that was encountered at the base of the pit limits the extraction depth. The material was crushed and graded on site, and the products were ferried across the Saint John River to be used for an asphalt paving project on the Trans-Canada Highway.

Moderate reserves of material remain to be extracted, principally in the area east of Coytown.

LOCATION #: G16-11
Type of Deposit: Marine/Bedrock
Exposure Type: Pit
Status: Abandoned

NTS: 21 G/16
County: Queens
Parish: Cambridge
UTM: 239 805

SECTION DESCRIPTION & COMMENTS:

Borrow material was extracted from the site. DOT (1960) reported thicknesses of 1 to 2 m of very dirty, coarse-grained gravel (reworked till?) overlying silt or bedrock. The potential for high-quality aggregate is nil.

DOT (1960) also sampled beach material along the shore of Grand Lake. The fines content ranged from 9.9 to 30.4% (finer than 75 μ m) and the Los Angeles abrasion loss was 41.0%. It is undesirable to remove material from the beach zone.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m^3) probable
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LOCATION #: G16-12
Type of Deposit: Alluvial(?)
Exposure Type: Road cut
Status: Undeveloped

NTS: 21 G/16
County: Queens
Parish: Cambridge
UTM: 259 741

SECTION DESCRIPTION & COMMENTS:

About 1 m of sand and gravel material is exposed along road cuts.

DOT (1974) tested a property nearby and obtained the following information:

Percentage finer than 75 μ m: range 3.5 to 5.5%
Los Angeles abrasion loss: range 40.6 to 42.1%
Recommended usage: borrow and subbase material

Up to 2.7 m of sandy fine to medium gravel is present in places. Silty clay and till-like material underlie the deposit at depths of 2 m in places, and the water table was locally intersected at a depth of 1.2 m. The sorting of the material varies.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Limited

LOCATION #:	G16-13	NTS:	21 G/16
Type of Deposit:	Ice-contact	County:	Queens
Exposure Type:	Pit	Parish:	Gagetown
Status:	Active on demand	UTM:	204 707

SECTION DESCRIPTION & COMMENTS:

2.0 m Gravel: Sandy pebble gravel.

4.0 m Silt: Red-brown clayey silt, with massive to rhythmic bedding.

The sample was collected from a well-sorted sand bed. The extent of the deposit is limited. The landform was mapped by Gadd (1973) as an esker. Only minor activity was taking place on site during year of survey. The material is suitable as a source of borrow.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing		100.0	99.4	93.8	77.9	57.8	39.3	18.2	2.7	2.6

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Limited

APPENDIX B

SITE DESCRIPTIONS

CODYS MAP AREA

21 H/13

LOCATION #:	H13-1	NTS:	21 H/13
Type of Deposit:	Outwash	County:	Queens
Exposure Type:	Pit	Parish:	Wickham
Status:	Active on demand	UTM:	750 747

SECTION DESCRIPTION & COMMENTS:

Extensive but relatively shallow workings expose 2 to 3 m sections of mainly coarse cobbly pebble gravel. Clasts are well rounded, consist principally of sandstone, and commonly measure greater than 45 cm in diameter. DOT (1972) sampled the material and noted a Los Angeles abrasion loss of 43.9%. The coarseness of the deposit was emphasized (34% of the material returned on the 76 mm sieve) and the aggregate was recommended for borrow and subbase. Stockpiles of crushed aggregate were seen on site at the time of the visit.

Reserves have been calculated for the portion of the deposit lying south of Highway 695. An estimated 40,000 m³ may also be found on the north side of the highway but more detailed work is needed to correctly assess the potential of that area.

MECHANICAL ANALYSIS: DOT (1972)

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	59	-	38	32	26	22	-	10	-	-	3.3

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
21	0.5	2	10,000

LOCATION #: H13-2
Type of Deposit: Alluvial
Exposure Type: Pit
Status: Inactive

NTS: 21 H/13
County: Queens
Parish: Johnston
UTM: 862 837

SECTION DESCRIPTION & COMMENTS:

A pit, developed in alluvial sediments, was examined by DOT (1968). The excavations included sandy, fine to coarse gravel, generally 1.5 m thick, overlying silty clay, till or bedrock. Testing of the material gave the following results:

Percentage finer than 75 μ m: range 0.8 to 4.0%; mode 1.8%
Los Angeles abrasion loss: range 38.1 to 38.4%
Water table depth: 1.5 to 1.8 m
Recommended usage: borrow, subbase and base course aggregate

DOT (1968) recommended crushing to 32 mm to improve the grading. The deposit was noted to be erratic and shallow.

Two additional properties were tested south of the Trans-Canada Highway near the intersection with Highfield Road. The deposit consists of fine deltaic outwash sediments, mainly silty sand and sand. Up to 3.3 m of material has been reported from test holes, but due to its fine texture, recommended usage was for borrow only.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m^3)
			probable
			Limited

LOCATION #: H13-3

NTS: 21 H/13

Type of Deposit: Ice-contact

County: Kings

Exposure Type: Pit

Parish: Springfield

Status: Inactive

UTM: 877 716

SECTION DESCRIPTION & COMMENTS:

Pit faces are 4 to 6 m high and most are slumped. Where exposed, the material consists of poorly sorted, moderately compact to loose, pebbly to cobbly sand and some gravelly beds. A few boulders have been noted, measuring up to 50 cm in diameter. Clasts are subrounded and have varied lithologies. Rhythmically bedded reddish brown silt and sand occur at the top of some sections. The esker is flanked by moderately sorted cobbly and pebbly sand exposed in an abandoned pit, 200 m southwest of this locality.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	96.3	86.4	82.2	68.9	56.2	43.8	34.0	23.6	14.9	9.9	7.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 30(%)

sandstone 21; weathered 4; felsic
volcanic 3; metasediments 2

Sound Lithotypes 70(%)

sandstone 43; felsic volcanic 14;
quartz 6; metasediments 3; quartzite 2;
mafic intrusive 1; felsic intrusive 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
5	1	4	40,000

LOCATION #:	H13-4	NTS:	21 H/13
Type of Deposit:	Outwash	County:	Kings
Exposure Type:	Pit	Parish:	Springfield
Status:	Active on demand	UTM:	921 697

SECTION DESCRIPTION & COMMENTS:

1.5 m Gravel: Sandy medium pebble gravel topsets.

6.0 m Sand: Well-sorted, well-stratified medium sand foresets; some thin horizons of fine pebbly gravel and very few coal laminae.

Most of the deposit is abandoned and large volumes of material have been removed. It is lobate in shape and probably deltaic in origin. The reserve estimate does not take into consideration a possible extension of the deposit in the Snyder Brook area because of poor access and absence of well-defined landforms.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing						100.0	95.8	48.0	10.8	2.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 11(%)

sandstone 4; felsic intrusive 4;
weathered 1; siltstone 1; metasediment 1

Sound Lithotypes 89(%)

sandstone 39; felsic volcanic 13; meta-
sediment 12; quartz 10; quartzite 8;
metavolcanic 3; mafic volcanic 2;
felsic intrusive 2

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
52	15	3	450,000

LOCATION #: H13-5
Type of Deposit: Outwash
Exposure Type: Pits
Status: Inactive

NTS: 21 H/13
County: Kings
Parish: Studholm
UTM: 948 745

SECTION DESCRIPTION & COMMENTS:

Large volumes of material have been extracted from this glaciofluvial deltaic deposit. DOT (1966; 1980) tests show the following:

Percentage finer than 75 μ m: range 1.6 to 15.2%; mode 7.8%
Los Angeles abrasion loss: range 20.1 to 30.1%

Up to about 4 m of material is exposed in the sections. The sorting is variable: from fine sandy gravel to very dirty coarse gravel. Boulders up to 50 cm in diameter have been noted. The original deposit is largely depleted. Areas south and southeast of this locality probably contain significant reserves of aggregate but more detailed work is needed to accurately evaluate the extraction potential. Material would likely be finer textured in these areas.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable (see text)
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LOCATION #:	H13-6	NTS:	21 H/13
Type of Deposit:	Ice-contact	County:	Kings
Exposure Type:	Pit	Parish:	Studholm
Status:	Active on demand	UTM:	949 751

SECTION DESCRIPTION & COMMENTS:

An 8 m pit face displays material varying from sand beds to cobbly gravel strata with interstratified lenses of diamicton. Compact reddish brown till is exposed at the base of the pit.

About 200 m north of this locality, a small pit exhibits a 5 m section of coarse and poorly sorted sand and cobble gravel.

DOT (1968, 1972) sampled the deposit and obtained the following results:

Percentage finer than 75 μ m:	range 2.9 to 20.6%; mode 7.0%
Los Angeles abrasion loss:	range 29.6 to 35.8%; mode 31.6%
Recommended usage:	borrow, subbase, borderline base course aggregate

In general, much textural variability can be expected and the chance of finding well-sorted aggregate is low. Reserve estimates include a small ice-contact ridge located southwest of the Trans-Canada Highway on Highway 870. The estimate is based on the results of tests done by DOT in the general area and includes marginal grade material.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
20	15	2	300,000

LOCATION #: H13-7
Type of Deposit: Ice-contact
Exposure Type: Road cut
Status: Undeveloped

NTS: 21 H/13
County: Kings
Parish: Studholm
UTM: 982 787

SECTION DESCRIPTION & COMMENTS:

Kame and kettle topography characterizes the lower reach of Beatty Brook. The local relief is in the order of 4 to 5 m. A few exposures suggest that the material consists of poorly sorted pebbly sand.

Estimated reserves are in excess of 1 million m³ for the main part of the deposit. More material can be found along the Millstream River, and between Summerfield and Head of Millstream. Textural variability can be expected throughout the deposit.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Substantial
			(see text)

LOCATION #:	H13-8	NTS:	21 H/13
Type of Deposit:	Outwash	County:	Kings
Exposure Type:	Pit	Parish:	Studholm
Status:	Active on demand	UTM:	041 839

SECTION DESCRIPTION & COMMENTS:

Sections in this pit display 3 to 4 m of moderately sorted sand and cobbly pebble gravel. Till and some poorly sorted pebbly sand cap the southeastern section. Water accumulates at the base of the pit suggesting the presence of till or silt/clay beds. DOT (1981) reported till, bedrock and silt on properties tested for gravel occurred on the tested properties. Los Angeles abrasion loss was 36.7% and the material was recommended for borrow and blending sand.

About 2 km northeast of this location, along Highway 880, poorly exposed sections in an abandoned pit showed till overlying red-brown sandy pebble gravel.

Reserves have been estimated for the outwash deposit that extends northeasterly from Gibbon to the edge of the map area. Most of the material occurs southwest of Head of Millstream. Factors that may limit the extraction potential include a shallow water table, roads and buildings, and a thin, erratically graded deposit.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
160	30	2	600,000

LOCATION #: H13-9
 Type of Deposit: Outwash
 Exposure Type: Pit
 Status: Active on demand

NTS: 21 H/13
 County: Kings
 Parish: Studholm
 UTM: 986 759

SECTION DESCRIPTION & COMMENTS:

Section Near Entrance to Pit:

2.5 m Sand and Gravel: Horizontally bedded, well-sorted sand and fine sandy pebble gravel. Clasts are generally rounded, but vary from well-rounded sandstone pebbles to angular volcanic pebbles. A wide variety of lithotypes is noted. A 20 cm bed of coarse cobble gravel occurs at the base of this unit.

2.0 m Till/Bedrock: Red pebble sandstone-conglomerate; mixed, stratified, compact reddish beds of pebbly sand and compact, poorly sorted light brown pebbly sand of possible ice-contact origin.

North Section:

0.5 m Gravel: Coarse sandy pebble gravel topset.

2.0 m Sand: Sandy, well-sorted foresets including a paleoflow of 170°.

Upper Lift:

The northeast face displays coarse, subangular to angular bouldery cobble gravel;
 (CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	89.6	73.2	66.6	52.3	42.3	35.8	26.0	11.5	3.8	1.8	1.0
	80.6	79.9	78.3	74.0	68.5	61.7	53.6	42.7	29.7	17.7	11.1
					100.0	99.5	98.4	86.0	42.8	29.8	11.4

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 13 %
 sandstone 11; chert 1; schist 1

Sound Lithotypes 87 %
 sandstone 41; felsic volcanic 17; meta-
 sediments 9; quartzite 7; quartz 4;
 felsic intrusive 3; mafic volcanic 2;
 conglomerate 2; metavolcanic 2

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
350	10	4	400,000

LOCATION #: H13-9 (Continued)

SECTION DESCRIPTION & COMMENTS:

some of the clasts are striated. In places, the material has a weathered conglomerate bedrock texture: moderately loose, red-brown coarse sand with some pebbles.

. Reserve estimates have been calculated for the valley train outwash deposit that extends from Summerfield to the Trans-Canada Highway, along the Millstream River. Although they cover a large surface, the workable reserves are thought to be limited. Limiting factors include a shallow water table, roads and buildings and in many places, the shallow nature of the deposit itself. Compact silty sand till or red silt has been observed at the base of the sections. Most of the reserves are concentrated in the vicinity of Centreville.

LOCATION #:	H13-10	NTS:	21 H/13
Type of Deposit:	Ice-Contact	County:	Kings
Exposure Type:	Pit	Parish:	Studholm
Status:	Active on demand	UTM:	042 742

SECTION DESCRIPTION & COMMENTS:

0.3 m Overburden: Bulldozed topsoil.

0.3 m Till: Very compact red-brown pebbly silt till.

1.4 m Sand and Gravel: Sand and gravel beds show textural discontinuity, both laterally and vertically. Individual beds are well sorted and vary from loose fine pebble gravel to medium sand. A few red sandy silt beds have been noted. Clasts are moderately rounded and up to 10 cm in diameter. Faulted and convoluted beds suggest an ice-contact origin for the deposit or the occurrence of glacial overriding.

Near the southeast entrance to the pit, till and reddish brown sandy silt overly about 2.5 m of sand.

As a whole, the deposit is mostly fine grained (sandy) with a limited fine sandy pebble gravel horizon.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	100.0	99.1	93.1	85.4	75.4	61.4	44.7	31.5	19.5	10.4

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 16 %

sandstone 15; chert 1

Sound Lithotypes 84 %

felsic volcanic 23; sandstone 22;
felsic intrusive 13; metasediments 11;
quartzite 10; quartz 4; metavolcanic 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
11	1	1.5	15,000

LOCATION #: H13-11 NTS: 21 H/13
 Type of Deposit: Ice-Contact County: Kings
 Exposure Type: Pit Parish: Studholm
 Status: Active on demand UTM: 056 737

SECTION DESCRIPTION & COMMENTS:

Sections expose material that shows wide lateral and vertical variability of texture from red sandy silt laminae to beds of well-sorted medium sand and fine sandy pebble gravel. A compact red stony till overlies the sand and gravel near the pit entrance.

This mainly sandy deposit probably originated in a temporary ice-dammed lake located on the interfluvium between the Millstream River valley and the Smith Creek valley.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing		100.0	99.1	95.9	89.2	82.5	69.2	24.7	8.7	5.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	25 %	Sound Lithotypes	75 %
sandstone 22; conglomerate 2; metasediment 1		felsic volcanic 19; quartzite 14; metasediments 11; sandstone 10; felsic intrusive 9; metavolcanic 5; quartz 2; gneiss 2; mafic volcanic 1; felsic volcanic 1; siltstone 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Limited
3			

LOCATION #: H13-12
Type of Deposit: Ice-Contact
Exposure Type: Pit
Status: Inactive

NTS: 21 H/13
County: Kings
Parish: Studholm
UTM: 055 696

SECTION DESCRIPTION & COMMENTS:

This deposit is a southwesterly extension of a more extensive ice-contact deposit lying off this map area. DOT (1965) visited the site and sampled the material. It consists of sand to silty sand and fine sandy gravel. The percentage of fines (passing 75 μ m) ranges from 4.2 to 7.1%. The material was recommended for borrow and as a possible source of blending sand.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes (%)

Sound Lithotypes (%)

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
4	1	1.5	15,000

APPENDIX C

SITE DESCRIPTIONS

SALISBURY MAP AREA

21 1/3

LOCATION #: I3-1
Type of Deposit: Outwash
Exposure Type: Pits
Status: Inactive

NTS: 21 I/3
County: Queens
Parish: Brunswick
UTM: 140 047

SECTION DESCRIPTION & COMMENTS:

1.5 m Sandy Gravel: Moderately coarse sandy gravel. Clasts vary from subrounded (sandstone) to subangular (igneous). The material is moderately sorted and contains boulders up to 0.8 m in diameter.

Kingston (1974b) noted the following:

"The materials comprising the deposit vary from rather dirty, poorly sorted medium-sized cobble gravel, to clean, well sorted, medium to coarse and slightly pebbly sand. Within the sandy portions of the deposit, proven material thickness was never greater than 6 or 7 feet (1.8 to 2.1 m). The results of testing of material from certain locations within these deposits indicate that, subject to slight adjustment of grain size distribution by blending, the sand should be suitable for use as concrete aggregate. The presence of small coal clasts in the material is not thought to be significantly detrimental to this usage... Information obtained from the operations foremen indicated a clay base beginning closely beneath the pit floor. In general, it is expected that substantial volumes of sand would be recoverable from the deposit through extensive surface mining techniques, even despite the evident minimal thickness. Such an operation would be possible only at the expense of the disruption of some valuable farm land and considerable forested areas.

(CONTINUED)

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
980	400	0.5	2 million

LOCATION #: I3-1 (Continued)

SECTION DESCRIPTION & COMMENTS:

Presently available reserves depend, to a great extent, on the minimum economical mining thickness. Nearly all of the deposit is just under 2 yards (1.8 m) in thickness and, thus a minimum cut-off mining thickness of 1.5 yards (0.5 m) was chosen Only areas presently classed as inactive farm land and forested land are included in these reserve calculations."

DOT (1961, 1974, 1978) analyzed the material and obtained the following results:

Percentage passing 75 μ m: range 0.4 to 9.9%; mode 1.6% (number of samples = 43)
Los Angeles abrasion loss: range 25.0 to 35.9%; mode 31.9% (number of samples = 21)
Depth of water table: range 0.6 to 3.0 m; mode 1.8 m (number of test holes = 78)
Recommended usage: borrow, subbase and base course (31 mm crushed aggregate)

Although mapped as glaciofluvial outwash, the deposit has been interpreted as alluvial or estuarine by Rampton and Paradis (1981b).

LOCATION #: I3-2

NTS: 21 I/3

Type of Deposit: Ablation till

County: Kings

Exposure Type: Test holes

Parish: Havelock

Status: Undeveloped

UTM: 167 042

SECTION DESCRIPTION & COMMENTS:

DOT (1978) examined the deposit and found sandstone bedrock at depths ranging from 1.2 to 2.7 m. The ablation till overlying the bedrock was described as fine textured, varying from silty fine sand to silt.

The aggregate potential is low and the material present can only be recommended as low-grade fill.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
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LOCATION #: I3-3
Type of Deposit: Ice-contact
Exposure Type: Pit
Status: Inactive

NTS: 21 I/3
County: Kings
Parish: Havelock
UTM: 197 990

SECTION DESCRIPTION & COMMENTS:

2.1 m Sand and Gravel: Fine gravel to gravelly sand. Clasts are subrounded to subangular and predominantly sandstone.

1.5 m Bedrock: Weathered sandstone and conglomerate.

There are several other small hummocks (kames) that have limited aggregate potential.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: I3-4
Type of Deposit: Outwash
Exposure Type: Pits
Status: Inactive

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 267 025

SECTION DESCRIPTION & COMMENTS:

0.6 m Overburden: Soil horizon; iron oxide cementation.

1.5 m Gravelly Sand: Coarse gravelly sand with abundant small pebbles in the 3 to 6 mm size range.

The southern pit is fairly sandy with up to 10% gravel. The deposit has been worked down to the water table. Large volumes of material have been extracted and the deposit is probably nearing depletion.

DOT (1961) tested the material and obtained the following results:

Percentage passing 75 μ m: range 0.6 to 8.1%; mode 2.3%
Los Angeles abrasion loss: range 26.6 to 27.6%; mode 27.6%
Water table depth: range 2.0 to 3.6 m

Clay and rocks (till?) were frequently noted at depths ranging from 0.3 to 2.0 m. Soundness loss for a fine aggregate sample was 3.7%; sand equivalent value was 94 and percent absorption was 1.84.

The material was recommended as a very low-grade subbase or for borrow. Some samples showed fairly good filter properties.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Minimal

LOCATION #: I3-5
Type of Deposit: Ice-contact
Exposure Type: Pit
Status: Inactive

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 267 988

SECTION DESCRIPTION & COMMENTS:

DOT (1958) examined the deposit. Testing of the material gave the following results:

Percentage finer than 75 μ m: 0.2 to 0.4%
Los Angeles abrasion loss: 30.9%
Proposed use: borrow

The water table depth varied between 1.2 and 2.4 m. Test holes showed 1.2 to 2.7 m of sand and fine gravel material.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: I3-6
Type of Deposit: Ice-contact
Exposure Type: Pits
Status: Inactive

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 289 967

SECTION DESCRIPTION & COMMENTS:

2.5 m Gravel: Poorly bedded, poorly sorted, coarse, silty gravel. Some incorporated peat balls and armoured till balls. Becomes sandier southward, varying to coarse pebbly sand.

Tests done on a 45 kg bulk sample gave the following results:

Soundness (fine aggregate): 6.9% loss
Absorption percentage: 1.64%
Sand equivalent value: 90

DOT (1961) sampled the sandy part of the deposit and obtained the following results:

Percentage passing 75 μ m: range 0.6 to 4.5%; mode 2.1%
Los Angeles abrasion loss: 27.9 to 32.0%
Recommended usage: borrow, low-quality subbase

DOT (1961) recorded the presence of water at a depth of 3.4 m.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #:	I3-7	NTS:	21 I/3
Type of Deposit:	Ice-contact	County:	Westmorland
Exposure Type:	Pit	Parish:	Salisbury
Status:	Inactive	UTM:	302 964

SECTION DESCRIPTION & COMMENTS:

0.6 m Overburden: Oxidized soil horizon consisting of gravelly sand.

2.1 m Gravelly Sand: Medium to coarse gravelly sand with some beds of finer sand and fine sandy gravel. Sandstone and igneous lithotypes predominate.

The extraction depth is limited by the water table and the probable presence of till at a shallow depth below the floor of the pit.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Depleted

LOCATION #: I3-8
Type of Deposit: Outwash
Exposure Type: Pit
Status: Abandoned

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 301 978

SECTION DESCRIPTION & COMMENTS:

0.9 m Gravel: Medium gravel, cobbly near the surface. Clasts are subangular to subrounded.

0.7 m Sand: Medium sand.

Testing of the material by DOT (1962) gave the following results:

Percentage finer than 75 μ m: range 4.1 to 5.9%
Los Angeles abrasion loss: range 33.3 to 34.5%
Recommended usage: borrow, subbase and base course aggregate

The water table or the presence of silt at shallow depths limits the potential of the deposit.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable (see text)

LOCATION #: I3-9
Type of Deposit: Bedrock
Exposure Type: Quarry
Status: Abandoned

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 325 036

SECTION DESCRIPTION & COMMENTS:

Mapped as a quarry developed in conglomerate bedrock by Brinsmead (1974a), the material is probably poorly consolidated, as DOT (1961) tested the property and obtained the following results:

Percentage finer than 75 μ m: range 1.2 to 3.9%
Los Angeles abrasion loss: range 21.3 to 40.3%
Recommended usage: subbase and base course

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m^3) probable

LOCATION #: I3-10
Type of Deposit: Ablation till
Exposure Type: Pit
Status: Active on demand

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 386 082

SECTION DESCRIPTION & COMMENTS:

Pit sections are 4 to 4.5 m high, but only the top 1 to 2 m are exposed. The texture of the material is extremely variable. Bouldery to cobbly beds occur near the top of the section and are underlain by stratified beds of moderately sorted sand and by compact and poorly sorted ablation till. Clasts are subangular to rounded and lithologically varied.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	97.5	91.2	88.5	74.2	63.7	55.9	47.2	34.5	23.3	15.4	11.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	9 %	Sound Lithotypes	91 %
conglomerate 5; sandstone 3; metasediment 1		felsic volcanic 38; quartzite 23; felsic intrusive 10; metasediment 6; sandstone 5; quartz 3; other 3; mafic volcanic 2; conglomerate 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
33	3	4	120,000

LOCATION #: I3-11
Type of Deposit: Ice-contact
Exposure Type: Road cut
Status: Undeveloped

NTS: 21 I/3
County: Westmorland
Parish: Moncton
UTM: 429 176

SECTION DESCRIPTION & COMMENTS:

1.5 m Sand: Stratified, moderately sorted sand and pebbly sand. Red fine sand laminae have been noted. Some convoluted bedding.

Boulders occur on the ground surface. Clasts are subrounded and mostly sandstone. The deposit takes the form of a low subdued ridge and is probably related to the Catamount Moraine.

Morainic landforms have been observed in the upper reaches of Lipsett Brook, northwest of I3-11. Road cuts display material of variable texture: sandy gravelly ablation till, bouldery ablation till and well-sorted glaciofluvial pebbly sand. The landforms are very subdued and are not clearly visible on aerial photographs. Factors limiting the usefulness of these deposits include inaccessibility, shallow water table and erratic grading.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing		100.0	92.9	90.5	88.8	86.5	78.4	43.1	12.2	4.4

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	67 %	Sound Lithotypes	33 %
sandstone 65; quartzite 1; schist 1		sandstone 32; quartzite 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable (see text)

LOCATION #: I3-12

NTS: 21 I/3

Type of Deposit: Ice-contact

County: Westmorland

Exposure Type: Pit

Parish: Salisbury

Status: Abandoned

UTM: 438 090

SECTION DESCRIPTION & COMMENTS:

0.6 m Overburden: Soil horizon.

1.2 m Sand: Fine to medium sand containing subangular clasts and numerous reddish cohesive silty interbeds.

A DOT (1979) field report indicates the presence of water at depths ranging from 1.0 to 2.5 m. One test hole recorded 1.0 m of silt below 0.3 m of sand. The material was tested for use as blending sand.

The esker is very narrow and recoverable reserves are concentrated in the southern extremity of the ridge.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
24	2	1.5	30,000

LOCATION #:	I3-13	NTS:	21 I/3
Type of Deposit:	Outwash/Ice-contact	County:	Westmorland
Exposure Type:	Pits	Parish:	Salisbury
Status:	Inactive	UTM:	406 061

SECTION DESCRIPTION & COMMENTS:

North Face:

0.9 m Gravel: Massive coarse gravel with large proportions of well-rounded sandstone cobbles and some subangular volcanic cobbles.

3.6 m Sand: Gravelly and pebbly medium to coarse, clean, sand.

East Face:

1.2 m Gravel: Poorly bedded fine sandy gravel.

4.2 m Gravel: Poorly sorted, massive coarse boulder gravel.

DOT (1958, 1968) tests gave the following results:

Percentage passing 75 μ m: range 0.3 to 41.2%; mode 2.2%
 Los Angeles abrasion loss: range 33.0 to 53.7%; mode 40.2%
 Recommended usage: borrow and borderline subbase

DOT (1981) tested an area 1.5 km east of I3-15 along North River. Results of test excavations indicate that the water depth ranges from 2.1 to 3.7 m and that the material
 (CONTINUED)

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Limited

LOCATION #: I3-13 (Continued)

SECTION DESCRIPTION & COMMENTS:

consists of fine sand, in places underlain by silt or silty sand.

Kingston (1947b) offered the following general comments on the North River esker-outwash complex:

"Before the development of pit operations, this deposit comprised an eskerine ridge probably up to 12 m in height, ranging in width from about 90 m to 300 m and extending longitudinally for a distance of 2.6 km. Several smaller ice-contact mounds are clustered near the southern end of the esker.

The ice-contact deposits in general are composed of stratified, cross-bedded and somewhat faulted granular materials varying from gravelly sand to medium gravel with the northern end of the larger esker being composed of extremely coarse gravel.

The North River esker has, for some years, been heavily developed by extractive operations. Much of the eskerine ridge is depleted down to the water table...

The outwash deposit to the east of this esker has a material thickness above water table varying from about 1.8 m in the south to 6 m in the north. Two pits of substantial proportions are developed in the deposit. Some reserves probably remain in the central portion of the deposit... Material varies from medium sand to medium coarse gravel...

Presently available reserves of concrete aggregate blending sand in this area are probably not in excess of 250,000 cu yds. (191,000 m³) thickness of 2 yards (1.8 m)."

LOCATION #: I3-14
Type of Deposit: Ice-contact
Exposure Type: Pit
Status: Inactive

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 403 058

SECTION DESCRIPTION & COMMENTS:

West Face:

0.9 m Gravel: Poorly bedded, poorly sorted, medium sandy and silty gravel. Clasts are subrounded to rounded, mainly sandstone, and up to 12 cm in diameter.

1.8 m Gravelly Sand: Cross-bedded, gravelly sand with fine interbeds of medium sand and some 5 cm thick gravel beds. Clasts are well rounded and most fall within the 60 mm to 130 mm range.

North Face, East End:

1.5 m Gravel: Massive and poorly sorted gravel with clasts subangular to rounded and up to 20 cm in diameter. Sandstone and igneous lithologies predominate.

6.7 m Sand: Cross-bedded, medium to coarse sand, gravelly sand and some medium to coarse gravel. Much vertical and horizontal textural variation exhibited. Seismic data shows that bedrock occurs at a shallow depth below the floor of the pit.

In 1974, Brinsmead (field notes, unpublished) indicated reserves of sand and gravel of 150,000 m³ and 15,000 m³, respectively. Reserves are considerably less today.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: I3-15
Type of Deposit: Outwash
Exposure Type: Pits
Status: Inactive

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 404 053

SECTION DESCRIPTION & COMMENTS:

West Face:

1.8 m Sand: Medium to coarse sand interbedded with fine silty sand near the top of the section. The sands become cleaner, coarser, and more gravelly toward the south.

East Face:

2.1 m Sand: Medium to coarse gravelly sand with medium to coarse sand interbeds. The material is poorly sorted and silty. Clasts are subrounded and consist mostly of sandstone and shale. Shale pebbles are friable and rotten.

North Face:

2.4 m Gravel: Poorly sorted, medium to coarse gravel. Igneous pebbles are subrounded to subangular; sedimentary clasts are generally rounded. Wide textural range and abundance of fines.

Testing of the material by DOT (1978) gave the following results:

Percentage passing 75 μ m: range 2.3 to 7.5%; mode 4.2%

(CONTINUED)

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m^3)
			probable
			Limited

LOCATION #: I3-15 (Continued)

SECTION DESCRIPTION & COMMENTS:

Los Angeles abrasion loss: range 36.0 to 40.3%
Approved for use as: borrow, subbase, blending sand
Water table: range 0.6 to 3.7 m; mode 1.2 m

Additional tests were performed on a 45 kg bulk sample collected by Brinsmead (Kingston, 1974b):

Soundness loss: 20.3% (fine aggregate)
Absorption percentage: 1.86%
Sand equivalent value: 79
Organic value: 3

LOCATION #: I3-16
Type of Deposit: Ice-contact
Exposure Type: Pit
Status: Abandoned

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 397 049

SECTION DESCRIPTION & COMMENTS:

1.2 m Sand and Gravel: Coarse gravelly sand with pebbles up to 6 cm in diameter. Igneous clasts are subangular and sandstones are rounded.

Testing of the material gave the following results:

Percentage passing 75 μ m: 0.9%
Los Angeles abrasion loss: 26.6%
Soundness loss (fine): 8.4%
Percent absorption: 1.02%
Organic: 1
Sand equivalent: 96

Some material was excavated below the water table by the use of a dragline.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Depleted

LOCATION #: I3-17
Type of Deposit: Ice-contact
Exposure Type: Pit
Status: Abandoned

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 395 043

SECTION DESCRIPTION & COMMENTS:

0.6 m Overburden: Soil horizon.

1.2 m Sand: Medium to coarse sand with small amounts of fines and some pebbles up to 5 cm in diameter. Clasts are mostly subangular to subrounded.

The deposit is depleted and has been worked down to the water table.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Depleted

LOCATION #: I3-18
Type of Deposit: Ice-contact
Exposure Type: Pit
Status: Abandoned

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 396 039

SECTION DESCRIPTION & COMMENTS:

0.6 m Overburden: Soil horizon.

1.8 m Sand: Poorly sorted, medium to coarse sand with some thin silty beds exhibiting ice-contact type compression and tension features. There are some gravelly beds with pebbles mostly in the range of 6 to 38 mm in diameter. Igneous clasts predominate and are mainly subangular; sandstone clasts are subrounded to rounded.

Section heights range from 1.0 to 2.5 m high and the extraction depth is limited by a shallow water table.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Depleted

LOCATION #: I3-19
Type of Deposit: Alluvium
Exposure Type: Pit
Status: Inactive

NTS: 21 I/3
County: Westmorland
Parish: Salisbury
UTM: 401 969

SECTION DESCRIPTION & COMMENTS:

1.0 m Silt: Alluvial silt.

1.5 m Gravel: Gravel and coarse gravelly sand.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

APPENDIX D

SITE DESCRIPTIONS

CHIPMAN MAP AREA

21 1/4

LOCATION #: I4-1
Type of Deposit: Alluvium
Exposure Type: Pit
Status: Inactive

NTS: 21 I/4
County: Queens
Parish: Chipman
UTM: 759 215

SECTION DESCRIPTION & COMMENTS:

A number of small pits have been opened in the Salmon River ancient alluvial deposits. The material consists principally of fine sand, up to, but generally less than 3 m thick. The sand overlies silt or till/bedrock.

DOT (1974) tested this location. One sample showed 2.3% material finer than 75 μ m and the recorded Los Angeles abrasion loss was 39.4%. The water table was frequently intersected at depths of 0.6 m to 1.2 m. Bedrock occurs close to the surface near the hillside.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m^3) probable Limited
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LOCATION #:	I4-2	NTS:	21 I/4
Type of Deposit:	Alluvium	County:	Queens
Exposure Type:	Pit	Parish:	Chipman
Status:	Inactive	UTM:	794 235

SECTION DESCRIPTION & COMMENTS:

2.0 m Sand: Moderately well sorted medium to fine sand.

2.0 m Silt: Rhythmically bedded sandy silt and clayey silt laminae.

DOT (1970, 1974) tested the general area. Results indicate that in the vicinity of a pit located 350 m northeast of this location, the thickness of fine sand generally exceeds 3.0 m. In one place, the water table was intersected at a depth of 2.4 m.

About 1.4 km north of this location, the alluvial deposit located between Highway 123 and the Gaspereau River consists of up to 3.0 m of coarse gravel generally underlain by clay. The water table was frequently intersected at depths ranging from 1.5 to 2.0 m.

Most of the extractable reserves are concentrated in the Gaspereau Forks area. Elsewhere, along the Salmon River, the alluvium is generally thin, the water table high or the access to the reserve limited by urban growth.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Moderate

LOCATION #:	I4-3	NTS:	21 I/4
Type of Deposit:	Outwash	County:	Queens
Exposure Type:	Pit	Parish:	Chipman
Status:	Active on demand	UTM:	806 220

SECTION DESCRIPTION & COMMENTS:

2.0 m Sand: Stratified sand and pebbly sand.

DOT (1972) examined the deposit and found the following results:

Percentage finer than 75 µm:	range 1.4 to 24.3%
Los Angeles abrasion loss:	range 47.9 to 60.1%
Water table depth:	range 0.7 to 2.4 m; mode 2.0 m

During test pitting, bedrock was encountered at depths ranging from 1 to 2 m. Up to 3 m of fine gravel can be found.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #:	I4-4	NTS:	21 I/4
Type of Deposit:	Ice-contact	County:	Queens
Exposure Type:	Pit	Parish:	Brunswick
Status:	Inactive	UTM:	997 065

SECTION DESCRIPTION & COMMENTS:

East Face:

1.0 m Sand: Fine sand and red-brown sandy silt with a few pebbles and some coal fragments.

1.5 m Sand: Moderately sorted, coarse pebbly sand. Clasts are rounded to well rounded.

3.5 m Slump Covered: Assumed to be mainly sandy material.

Compact red-brown stoney silt till is exposed at the top of a section in the northeast part of the pit. Boulders up to 75 cm in diameter occur in the pit and cobbles are common. Some of the clasts are well striated. The wide textural variation is indicative of an ice-contact environment. DOT (1973) obtained a Los Angeles abrasion loss of 43.2% on a coarse gravel sample.

Although aerial photograph interpretation suggests that the deposit extends southeasterly as a narrow, esker-like ridge, the reserve estimate only takes into consideration the northern half of the deposit. The material is in general only suitable as a source of borrow.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	100.0	98.0	95.0	85.9	69.0	48.2	31.5	20.4	14.8	10.4	6.8

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	37 %	Sound Lithotypes	63 %
sandstone 35; chert 1; conglomerate 1		sandstone 39; felsic intrusive 7; metasediment 6; quartzite 4; quartz 3; conglomerate 2; mafic volcanic 1; felsic volcanic 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
17	3	3	90,000

LOCATION #: I4-5
Type of Deposit: Ice-contact (?)
Exposure Type: Pit
Status: Active on demand

NTS: 21 I/4
County: Queens
Parish: Brunswick
UTM: 033 034

SECTION DESCRIPTION & COMMENTS:

The average face height is 6 to 8 m. Most sections are slumped and the greater part of the pit is abandoned. The activity is restricted to the lower lift in the west part of the pit.

Till, up to 2.0 m thick, caps the section and, in places, is overlain by up to 1.5 m of oxidized sandy gravel. The bulk of the deposit below the till consists of fine material: compact fine sand and reddish silty sand to loose coarse sand.

DOT (1959, 1961, 1966, 1973) sampled the deposit extensively and obtained the following results:

Percentage finer than 75 μ m: range 1.6 to 23.4%; mode 6.5%
Los Angeles abrasion loss: range 35.6 to 44.9%; mode 37.6%
Proposed use: borrow, borderline subbase and possible source of blending sand.

DOT observed that the deposit was texturally very variable and bouldery beds were noted.

Reserves are difficult to estimate because of the upper till and the subdued relief. Large volumes of material remain, but test-pitting will be necessary to further evaluate the potential for extraction.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			(See Text)

LOCATION #: I4-6
Type of Deposit: Alluvium
Exposure Type: Pit
Status: Abandoned

NTS: 21 I/4
County: Queens
Parish: Brunswick
UTM: 052 034

SECTION DESCRIPTION & COMMENTS:

0.9 m Gravel: Poorly stratified to massive fine to medium gravel. Clasts are subrounded to subangular.

1.2 m Sand: Very silty medium to coarse sand with some fine sand, silt and clayey silt interbeds.

The sand unit extends at least another metre below the floor of the pit. DOT (1959) tested the material and obtained the following results:

Percentage finer than 75 μ m: range 4.9 to 18.7%; average 9.1%
Los Angeles abrasion loss: 34.2%
Recommended usage: borrow, borderline subbase

Test holes by DOT (1959) indicate the presence of silt and clay, and possibly till, at depths of about 2 m, close to Highway 112. The thickness of the deposit is greater toward the edge of the terrace where up to 3.5 m of gravel has been recorded.

The extensive outwash body mapped in the Cherryvale area is not well known. Its potential is probably limited by a shallow water table.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
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APPENDIX E

SITE DESCRIPTIONS

SALMON RIVER ROAD MAP AREA

21 1/5

LOCATION #:	I5-1	NTS:	21 I/5
Type of Deposit:	Glaciofluvial outwash	County:	Northumberland
Exposure Type:	Pit	Parish:	Blissfield
Status:	Abandoned	UTM:	712 476

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

0.8 m Sandy Gravel: Crudely stratified fine to very coarse gravel with medium to very coarse sand, and a few cobbles and boulders; clasts are subrounded to rounded.

0.9 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.5 m.

This small outwash deposit lies in a portion of an abandoned channel of the Cains River. Similar deposits of smaller size may be present elsewhere along the valley. The very poor quality of the gravel renders the material suitable only for use as fill.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	70.9	63.8	47.7	37.7	29.7	22.3	12.0	3.7	1.1	0.4

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	80 %	Sound Lithotypes	20 %
sandstone 80		sandstone 14; quartzite 3; felsic intrusive 2; quartz 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: I5-2
 Type of Deposit: Ice-contact
 Exposure Type: Pit
 Status: Abandoned

NTS: 21 I/5
 County: Northumberland
 Parish: Blissfield
 UTM: 813 443

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

1.3 m Sandy Gravel: Crudely stratified fine to coarse gravel with predominantly medium to coarse sand; clasts are subrounded to rounded.

0.8 m Slump Covered: Assumed to be material as above.

Maximum clast size is 0.2 m.

This small pit is in a low, broad ridge, possibly a small esker segment. The deposit is not evident on the aerial photographs. Undiscovered deposits of similar size and quality may be present elsewhere in the area. However, due to the poor quality of the gravel, they would be suitable only for use as fill.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	81.4	77.8	68.0	58.5	50.0	40.9	27.4	12.4	5.3	2.8

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 64 %
 sandstone 64

Sound Lithotypes 36 %
 sandstone 13; metasediments 7;
 quartzite 6; felsic intrusive 4;
 felsic extrusive 2; mafic intrusive 2;
 greywacke 1; quartz 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #:	I5-3	NTS:	21 I/5
Type of Deposit:	Glaciofluvial outwash	County:	Queens
Exposure Type:	Pit	Parish:	Chipman
Status:	Active on demand	UTM:	799 298

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Silty soil, developed on the underlying material.

1.3 m Sandy Gravel: Generally fine to coarse gravel with fine to medium, coarsening downward to medium to coarse sand; unit is lightly to highly cemented, with many iron and manganese oxide bands; clasts are subrounded to well rounded.

0.5 m Sand: Cross-bedded medium sand with minor very fine to medium gravel; palaeoflow direction was southward; unit appears to be a lens.

0.4 m Sandy Gravel: Similar to the upper sandy gravel unit in texture.

0.8 m Slump Covered: Assumed to be material as above; the water table lies just below the base of the pit.

Maximum clast size is 0.6 m.

This deposit occurs as a blanket overlying till. The boundary indicated on the map approximately outlines the area in which the workable thickness of granular material exceeds 1 m. Smaller deposits of similar origin and quality are present to the south along the Gaspereau Valley. Reserves in these deposits are limited or nonexistent. A

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	75.0	66.6	51.8	43.1	38.3	33.6	22.1	5.0	0.9	0.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	85 %	Sound Lithotypes	15 %
sandstone 84; felsic intrusive 1		sandstone 7; quartzite 7; metasediment 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
30	10	1.5	150,000

LOCATION #: I5-3 (Continued)

SECTION DESCRIPTION & COMMENTS:

small ancient alluvial deposit flanking the main deposit has been largely depleted. It contained material similar to that described above.

The outwash deposit has been tested by DOT (1970, 1972). This test data, for 16 samples, is summarized below:

Mechanical Analysis:

between 24.7 and 59.3% passing 4.75 mm (34.0% average)

between 0.2 and 1.3% passing 75 μ m (0.8% average)

Los Angeles abrasion loss:

49.3 to 57.2% (53.1% average)

Recommended for use as borrow material; may be locally suitable for use as a borderline subbase.

LOCATION #:	I5-4	NTS:	21 I/5
Type of Deposit:	Ice-contact	County:	Kent
Exposure Type:	Pit	Parish:	Harcourt
Status:	Active on demand	UTM:	902 375

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

3.5 m Sandy Gravel: Cobbly, very fine to very coarse gravel with a few boulders and a variable matrix of very fine to very coarse sand; contains minor highly manganiferous pockets; clasts are subrounded to well rounded.

1.0 m Slump Covered: Assumed to be material as above.

The cobble and boulder content of the material is estimated at 5 to 10%. Maximum clast size in the pit area is 0.4 m. The material exposed in the flank of the deposit is generally finer, and much less cobbly; however, most of the material in the pit area appears to be similar to that described above.

This pit is in a large segment of the Salmon River esker, and is in the only accessible part of the segments extending from Spectacle Lake eastward to Big Forks Stream. Consequently, the variability of the material is unknown. However, it is probably high, similar to that observed in the major eastern segment of the esker (I5-6). The quality of the material is most likely poor.

Reserves are estimated only for the main esker segment lying between the pit and McLeod Brook. Since the smaller segments are inaccessible, the presence of granular aggregate material within them cannot be confirmed.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	56.8	53.8	43.6	32.6	23.7	17.3	11.8	7.3	4.9	3.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	43 %	Sound Lithotypes	57 %
sandstone 40; chert 3		sandstone 44; greywacke 8; felsic intrusive 3; mafic extrusive 1; metasediment 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
165	165	3	5 million

LOCATION #:	I5-5	NTS:	21 I/5
Type of Deposit:	Ice-contact	County:	Queens
Exposure Type:	Pit	Parish:	Chipman
Status:	Abandoned	UTM:	923 305

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

0.5 m Till: Dense, reddish brown till, containing slab-like sandstone blocks up to several metres long.

0.8 m Sandy Gravel: Cobbly, medium to very coarse gravel with medium to very coarse sand; clasts are subrounded to well rounded.

3.5 m Slump Covered: Assumed to be sandy gravel as above; the base of the pit is covered with such material.

Maximum clast size is 0.3 m, exclusive of the till. The cobble content of the material is estimated at approximately 5%.

Due to its capping of till, the extent of this deposit is indeterminate, and consequently no estimate of its potential reserves can be made. Detailed test pitting would be required to identify its extent. However, if the postulated boundary indicated on the map is reasonable, reserves could be in the order of half a million m³. Similar, undiscovered deposits could also be present in the area. However, the very poor quality of the gravel would render such deposits suitable only for use as fill.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	78.9	73.6	61.3	50.0	41.0	26.9	11.0	7.5	5.5	4.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	79 %	Sound Lithotypes	21 %
sandstone 74; felsic intrusive 5		sandstone 9; quartzite 6; metasediments 3; felsic intrusive 1; felsic extrusive 1; greywacke 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			Unknown

LOCATION #:	I5-6	NTS:	21 I/5
Type of Deposit:	Ice-contact	County:	Kent
Exposure Type:	Pit	Parish:	Harcourt
Status:	Active on demand	UTM:	019 407

SECTION DESCRIPTION & COMMENTS:

The material exposed in this large pit (maximum section height of approximately 20 m) is extremely varied, ranging from a clean, well-sorted, fine to medium sand (Sample A) to a poorly sorted, coarse to very coarse pebbly cobble gravel (Sample B). In general, the material appears to be coarsest in the lower core of the deposit, fining both laterally and vertically upward. Clasts in the deposit are generally subrounded to very well rounded; maximum clast size is 0.8 m. Coal particles are locally present in the sand units; weathered sandstone clasts are present in the gravels. Soil thickness is approximately 0.5 m.

Cross-bedding in the deposit indicates that the palaeoflow was toward the east.

DOT (1974, 1976) test data for the pit area are summarized below:

Mechanical Analysis: coarse aggregate (11 samples)
 between 31 and 66% passing 4.75 mm (48% average)
 between 1.6 and 6.5% passing 75 µm (3.3% average)

fine aggregate (14 samples)
 between 68 and 99% passing 4.75 mm (84% average)
 between 2.0 and 9.0% passing 75 µm (5.3% average)

Los Angeles abrasion loss: 39.0 to 50.1% (43.1% average)
 (CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing A					99.8	99.7	98.5	83.0	41.1	15.8	7.6
B	43.0	24.5	22.7	18.3	15.1	12.7	9.7	5.6	2.3	1.2	0.8

LITHOLOGIC ANALYSIS:

<u>Unsound Lithotypes</u>	<u>31 %</u>	<u>Sound Lithotypes</u>	<u>69 %</u>
sandstone 29; conglomerate 2		sandstone 50; greywacke 10; mafic extrusive 4; felsic extrusive 2; siltstone 1; metasediment 1; quartzite 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
210	210	10	21 million

LOCATION #: 15-6 (Continued)

SECTION DESCRIPTION & COMMENTS:

Recommended for use as borrow material; may be locally suitable for use as a marginal quality subbase. The fine aggregate is also suitable for use as filter, winter, or blending sand.

This deposit is the major segment of the Salmon River esker. Observations in road cuts in the surface of the deposit suggest that it will be highly variable throughout.

APPENDIX F

SITE DESCRIPTIONS

HARCOURT MAP AREA

21 1/6



LOCATION #:	I6-1	NTS:	21 I/6
Type of Deposit:	Ice-contact	County:	Kent
Exposure Type:	Pit	Parish:	Weldford
Status:	Active on demand	UTM:	331 511

SECTION DESCRIPTION & COMMENTS:

Ridge Crest Section (A)

0.5 m Soil: Silty soil, developed on the underlying material.

2.1 m Gravel: Very poorly sorted, slightly silty, cobbly, slightly bouldery, medium to very coarse gravel, with a matrix of fine to medium sand; clasts are subrounded to well rounded.

2.9 m Slump Covered: Assumed to be material as above.

East Flank Section (B)

0.5 m Soil: Silty soil, developed on the underlying material.

1.5 m Sand: Banded, fine to medium sand; upper portion is predominantly silty, lower portion is predominantly clean; contains minor small pebbles.

1.5 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.6 m. The western portion of the pit consists predominantly of very poor quality gravel, as described above. The eastern portion consists mainly of sand.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing											
A	62.2	34.9	32.7	26.7	23.0	20.7	19.3	16.4	10.3	6.3	4.4
B					99.5	99.3	99.1	90.4	24.6	9.6	5.9

LITHOLOGIC ANALYSIS:

<u>Unsound Lithotypes</u>	<u>96 %</u>	<u>Sound Lithotypes</u>	<u>4 %</u>
sandstone 96		sandstone 4	

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Limited

LOCATION #: I6-1 (Continued)

SECTION DESCRIPTION & COMMENTS:

This small esker segment is part of an esker system that extends from a point to the south (see I6-3), northward to the Kouchibouguacis River (see I11-8, 9, 10, 11). It is too small to contain significant reserves.

LOCATION #: I6-2

NTS: 21 I/6

Type of Deposit: Ancient alluvium

County: Kent

Exposure Type: Pit

Parish: Harcourt

Status: Abandoned

UTM: 204 464

SECTION DESCRIPTION & COMMENTS:

0.4 m Soil: Slightly silty soil, developed on the underlying material; a few gravel clasts are present on the surface.

1.0 m Sand: Clean, well-sorted, fine to medium sand.

The base of the pit is flooded. DOT (1983) data indicate that the sand is generally 0.5 to 0.9 m thick, but reaches a maximum thickness of 1.5 m. It overlies a silty clay.

The extent of the deposit is not evident from aerial photographs. However, the shallow thickness of the deposit and the high water table result in limited aggregate potential, irrespective of area. DOT (1983) estimated 4,000+ tons of material available and recommended the material as suitable for use as blending sand.

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing											
DOT (1983)						100.0	-	97.9 97.0	49.3 -	4.1 -	0.8 2.8

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #:	I6-3	NTS:	21 I/6
Type of Deposit:	Ice-contact	County:	Kent
Exposure Type:	Pit	Parish:	Weldford
Status:	Inactive	UTM:	339 449

SECTION DESCRIPTION & COMMENTS:

Crest Section

0.7 m Soil: Silty soil, developed on the underlying material.

1.3 m Sandy Gravel: Very crudely stratified, cobbly, fine to very coarse gravel with fine to coarse sand, and a few boulders; a thin (2 cm) clayey silt band is present 0.3 m below the top of the unit; the sample was obtained from this unit.

0.2 m Gravel: Openwork, predominantly fine to coarse gravel, with minor fine to medium sand.

3.4 m Slump Covered: Assumed to be materials similar to those above; a small exposure near the base of the section suggests that the material at this level may be sandier, the sand being medium to coarse.

Flank Section:

0.4 m Soil: Slightly silty soil, developed on the underlying material.

0.2 m Gravelly Sand: Poorly sorted very fine to coarse sand, with approximately 10% very fine to fine gravel.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	64.2	30.3	28.4	23.3	19.8	17.5	15.9	12.4	5.1	2.7	1.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	96 %	Sound Lithotypes	4 %
sandstone 96		sandstone 4	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
9	9	2	180,000

LOCATION #: I6-3 (Continued)

SECTION DESCRIPTION & COMMENTS:

1.2 m Sand: Faintly stratified, clean, well-sorted, fine to medium sand.

Clasts in this deposit are generally subrounded to well rounded. Maximum clast size in the pit area is 0.6 m. The sandy gravel appears to comprise the dominant material within the deposit.

This esker segment is the southern part of a system that extends northward to the Kouchibouguacis River (see I6-1; I11-8, 9, 10, 11).

LOCATION #:	I6-4	NTS:	21 I/6
Type of Deposit:	Glaciofluvial outwash	County:	Kent
Exposure Type:	Pit	Parish:	Harcourt
Status:	Active	UTM:	261 408

SECTION DESCRIPTION & COMMENTS:

0.4 m Soil: Slightly silty soil, developed on a gravelly fine to medium sand.

0.8 m Gravel: Poorly sorted, slightly cobbly, fine to very coarse gravel, with a matrix of fine to coarse sand; clasts are subangular to rounded.

- Till: Dense, reddish, gravelly clayey sand till.

The above section is in a test pit behind the western face of the pit. A nearby test pit exposes 0.6 m of sandy gravel (including soil) over 0.6 m of cross-bedded fine to medium sand (palaeoflow direction approximately eastward to northeastward) over water. The available exposures indicate that most of the pit area consists of gravel, or sandy gravel, similar to that described above; some is highly indurated. The deposit thickness appears to increase to approximately 2.0 m in the eastern part of the pit. Maximum clast size in the pit area is 0.6 m.

The flooded, abandoned pit to the north (UTM 263 413) appears to contain more sand, but is generally similar in character. A small pit to the northwest (UTM 225 447) contains material that is also similar, but with more cobbles and boulders.

All of these pits appear to be in small deposits with indefinite boundaries. Similar unidentified deposits could be scattered throughout the area. However, due to the very poor quality of the gravel, the material is suitable only for use as fill.

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	84.9	33.3	28.6	19.2	14.5	12.3	11.2	9.3	4.3	1.9	1.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	95%	Sound Lithotypes	5%
sandstone 95		sandstone 4; quartzite 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

APPENDIX G

SITE DESCRIPTIONS

BUCTOUCHE MAP AREA

21 I/7

LOCATION #:	I7-1	NTS:	21 1/7
Type of Deposit:	Outwash	County:	Kent
Exposure Type:	Pit	Parish:	Weldford
Status:	Active on demand	UTM:	471 478

SECTION DESCRIPTION & COMMENTS:

1.6 m Sand: Moderately to poorly sorted, moderately compact pebbly, silty sand with subrounded to subangular sandstone clasts, up to cobble size.

0.9 m Slump Covered: Assumed as above, in contact with bedrock at the base of the section.

The deposit is shallow to bedrock and the maximum thickness is probably 2.5 m. Bedrock is widely exposed on the pit floor. The material is low grade and suitable for fill only.

The surface expression of the deposit is very subdued making it difficult to establish boundaries. Detailed work would be required to assess the full extent of this marginal deposit.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	94.9	94.1	91.5	88.3	85.2	83.8	82.7	77.8	48.6	24.8	17.8

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	100%	Sound Lithotypes	0%
sandstone 100			

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Limited

LOCATION #:	I7-2	NTS:	21 I/7
Type of Deposit:	Outwash	County:	Kent
Exposure Type:	Pit	Parish:	St. Mary
Status:	Inactive	UTM:	535 355

SECTION DESCRIPTION & COMMENTS:

Most pit faces are slumped and are on average 2 m high. Where exposed in fresh cuts, the material consists of bedded, moderately well sorted, fine to medium sand. A few thin beds of slightly silty reddish sand and fine pebbly sand horizons occur. Ponding of water on the pit floor suggests the presence of an impervious layer at shallow depth and limits the extraction potential. The presence of sandstone slabs in parts of the pit suggest the proximity of bedrock. Near the pit entrance, a compact silt diamicton (till?) is exposed in a gully.

The sample was collected in the northern part of the pit.

About 1 km southwest of I7-2, shallow pits expose coarse and poorly sorted cobbly outwash overlying bedrock. Recoverable reserves are limited.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing						100.0	98.8	63.0	14.0	7.3

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
12	4	2	80,000

LOCATION #: I7-3 NTS: 21 I/7
 Type of Deposit: Ablation till County: Kent
 Exposure Type: Pits Parish: St. Mary
 Status: Active on demand UTM: 542 359

SECTION DESCRIPTION & COMMENTS:

1.0 m Gravel: Very coarse, bouldery gravel with a sandy matrix.

0.5 m Silt: Compact, reddish brown, blocky sandy silt till, with angular to subangular sandstone clasts.

3.0 m Sand: Poorly sorted, pebbly to cobbly sand with reddish sandy horizons.

Section heights range from 2 to 5 m and bedrock is commonly exposed on the floor of the pit. The overall sorting is poor, the texture coarse and the clasts angular. The deposit may have been emplaced in a calving bay, near the ice margin. An inactive quarry has been developed on the excarpment, south of I7-3.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
18	-	3	Limited

LOCATION #: I7-4 NTS: 21 I/7
 Type of Deposit: Outwash County: Kent
 Exposure Type: Pit Parish: Wellington
 Status: Active on demand UTM: 684 502

SECTION DESCRIPTION & COMMENTS:

0.6 m Overburden: Soil horizon.

0.5 m Gravel: Fine sandy gravel. Clasts are dominantly soft Carboniferous sandstone.

1.4 m Sand and Gravel: Fine sandy gravel.

3.0 m Sand: Medium to fine sand.

0.5+ m Rock: Sandstone bedrock.

One sample analyzed by DOT (1970) gave the following result:

Percentage finer than 75 μ m: 2.1%
 Los Angeles abrasion loss: 89.9%
 Recommended usage: borrow

The deposit probably originated as an apron of glaciofluvial sediments and may have been reworked during the transgression that followed deglaciation. It is shallow and has limited recoverable reserves.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
-	-	1.5	Limited

LOCATION #: I7-5
Type of Deposit: Marine
Exposure Type: Pits
Status: Inactive

NTS: 21 I/7
County: Kent
Parish: Wellington
UTM: 737 443

SECTION DESCRIPTION & COMMENTS:

Small pits have been opened in a fluviomarine deposit at the mouth of Biggs Brook. Up to 3.7 m of sand underlain by clay has been recorded by DOT (1960). Sandstone bedrock occurs at shallow depth in parts of the pits and imposes limits on the extent of the deposit. Up to 2 m of sandy gravel commonly caps the sand unit. The deposit may represent marine-reworked outwash possibly related to a zone of ablation moraine located west of I7-5, between Ward Corner and St-François-de-Kent.

DOT sampled a number of similar deposits in the general area with the following results:

Percentage finer than 200 μ m: range 0.4 to 3.4%; mode 1.4%
Los Angeles abrasion loss: range 79.8 to 92.9%; mode 87.9%

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
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LOCATION #:	I7-6	NTS:	21 I/7
Type of Deposit:	Ablation till	County:	Kent
Exposure Type:	Pit	Parish:	Dundas
Status:	Inactive	UTM:	668 293

SECTION DESCRIPTION & COMMENTS:

1.5 m Sand and Gravel: Coarse, poorly sorted sandy material with abundant cobbles and small boulders. Reddish coloured horizons. Clasts are angular to subangular.

2.5 m Slump Covered: Assumed to be as above, resting on red compact basal till and bedrock.

Throughout the pit, sections display coarse sandy material with a variable silt content. The pit is partly flooded. The material is only suitable as a source of fill or low-grade aggregate. The deposit was emplaced in an ice-proximal environment.

The boundaries of the deposit are ill-defined, but most of the material appears to be confined to a depression in the hills, immediately southeast of Notre-Dame village.

Terraces in the Cocagne River valley, 1.5 to 2.0 km downstream of Notre-Dame village, have been mapped as outwash. A small esker is also indicated on map 21 I/7. The sites were not visited but the presence of some aggregate is based on a study of the aerial photographs and the 20 to 25 m elevation of the landform.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Limited

LOCATION #: I7-7

NTS: 21 I/7

Type of Deposit: Alluvial

County: Westmorland

Exposure Type: Pits

Parish: Moncton

Status: Abandoned

UTM: 615 252

SECTION DESCRIPTION & COMMENTS:

Pits have been developed in a relatively shallow fluvial deposit that is underlain by varved sediments. The observed stratigraphy begins with bedrock in the river, passing into varves that are well exposed in gullies up to 2 m deep. These consist of rhythmically bedded brown sand laminae and red-brown clayey silt, becoming coarser and thicker upward, grading into a fluvial sequence at the top. The fluvial material consists of sandy gravel and sand. On site reserves are nearly depleted and remaining reserves are undefined. More sand and gravel can be expected on the terrace indicated on map 21 I/7, but workable depths are expected to be shallow.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable (See Text)
35			

APPENDIX H

SITE DESCRIPTIONS

RICHIBUCTO MAP AREA

21 I/10

LOCATION #: I10-1
Type of Deposit: Marine
Exposure Type: Pit
Status: Inactive

NTS: 21 I/10
County: Kent
Parish: St-Louis
UTM: 511 779

SECTION DESCRIPTION & COMMENTS:

DOT (1958) described the material as consisting of predominantly well-rounded soft brown sandstone gravel. The material was recommended for borrow only and the 97.5% Los Angeles abrasion loss pointed to its susceptibility to disintegration under traffic. The low percentage of fines in the samples (0.2% less than 75 μ m) suggests a marine origin to the deposit. DOT samples were obtained from a 2.5 m exposure.

Soil maps suggest that this report is a northeasterly extension of the beach ridge described at location I10-2.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area
(hectares)

area workable
(hectares)

average thickness
(metres)

recoverable
reserves (m^3)
probable
Limited

LOCATION #:	I10-2	NTS:	21 I/10
Type of Deposit:	Marine	County:	Kent
Exposure Type:	Pit	Parish:	St-Louis
Status:	Active on demand	UTM:	488 764

SECTION DESCRIPTION & COMMENTS:

A large shallow pit has been opened in a beach ridge. At the time of visit, parts of the pit were flooded and abandoned. Sections range in height from 2 to 4 m. The material generally consists of stratified, well-sorted, coarse sandy pebble gravel to pebbly sand. The material has a very low silt content. The clasts are well rounded and predominantly sandstone. Red stony sandy silt till is exposed on the floor of the pit.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing			100.0	99.3	98.5	96.4	64.4	11.4	2.7	1.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	98%	Sound Lithotypes	2%
sandstone 97; quartz 1		quartzite 1; quartz 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
18	4	2	80,000

LOCATION #:	I10-3	NTS:	21 I/10
Type of Deposit:	Outwash	County:	Kent
Exposure Type:	Pit	Parish:	Richibucto
Status:	Active on demand	UTM:	504 681

SECTION DESCRIPTION & COMMENTS:

1.0 m Sand: Horizontally bedded, moderately to well-sorted, coarse to fine pebbly sand to sand. Clasts are well rounded to subrounded and predominantly sandstone.

3.0 m Slump Covered: Assumed to be as above.

Large volumes of material have been extracted in the past, but recoverable reserves are limited by the proximity of peatlands to the north, a railway right-of-way to the south and a shallow water table.

At the time of visit, various grades of fine aggregate were stockpiled on the site. High-quality coarse aggregate is imported, crushed and blended with the local sand. Equipment included a portable grader, a Case W24B front-end loader and a portable pump.

Uniformity of grade and apparent kettle holes suggest that the deposit originated as proglacial outwash. A landform observed on aerial photographs and located in the St-Charles bog about 2 km north of I10-3 may represent an extension of the present deposit.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	91.4	86.3	81.7	68.6	62.9	60.4	58.6	52.2	11.9	1.8	1.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	90%	Sound Lithotypes	10%
sandstone 86; quartz 2; metasediment 2		quartz and quartzite 5; metasediment 4; felsic intrusive 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
30	3	3	90,000

LOCATION #: I10-4
Type of Deposit: Outwash
Exposure Type: Pits
Status: Active

NTS: 21 I/10
County: Kent
Parish: Richibucto
UTM: 522 668

SECTION DESCRIPTION & COMMENTS:

McDonald Paving Pit (north side of Hwy. 116)

3.5 m Gravel: Moderately well sorted sandy pebble gravel. Clasts are dominantly sandstone.

3.5 m Sand: Well-sorted, cross-bedded sand.

At the time of visit, equipment on site consisted of weighing scales, 1 portable crusher-screener, an asphalt plant and several front-end loaders. Sound aggregate is imported to the site and blended with the local material.

DOT Pit (south side of Hwy. 116):

2.0 m Sand: Well-bedded, moderately well sorted sand and pebbly sand with a few sandy pebble gravel beds.

4.0 m Slump Covered: Assumed to be as above.

Depth of excavation may be limited by the presence of silt or bedrock.

Testing of the material by DOT (1970) gave the following results:
(CONTINUED)

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	83.4	79.2	73.5	63.1	59.0	57.4	55.9	51.1	20.4	2.1	0.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 88%

sandstone 79; metasediment 4; felsic intrusive 2; weathered 1; quartzite 1; quartz 1

Sound Lithotypes 12%

metasediment 5; mafic intrusive 2; quartzite 2; felsic volcanic 1; sandstone 1; quartz 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
38	3	4	120,000

LOCATION #: I10-4 (Continued)

SECTION DESCRIPTION & COMMENTS:

Percentage finer than 75 μ m: range 0.4 to 6.7%; mode 0.5%

Los Angeles abrasion loss: range 81 to 88.5%

Recommended usage: borrow only

DOT noted the poor quality of the coarse constituents and the compaction problem associated with deficiencies in certain grades of sand.

LOCATION #: I10-5
Type of Deposit: Outwash
Exposure Type: Pit
Status: Inactive

NTS: 21 I/10
County: Kent
Parish: Richibucto
UTM: 603 642

SECTION DESCRIPTION & COMMENTS:

0.5 m Sand and Gravel: Sand and sandy pebble gravel.

0.5 m Till: Compact, reddish diamicton with angular to subrounded sandstone clasts.

3.0 m Slump Covered: Assumed to be till overlying weathered sandstone bedrock.

Fresh bedrock is exposed at the base of the pit.

Another pit, located about 600 m northwest of I10-5 displayed sections with no more than 2 m of dirty sand and gravel overlying sandstone bedrock.

Occurrences of sand and gravel in the vicinity of I10-5 are thought to represent marine-reworked glaciofluvial outwash.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #:	I10-6	NTS:	21 I/10
Type of Deposit:	Outwash	County:	Kent
Exposure Type:	Pit	Parish:	Richibucto
Status:	Active on demand	UTM:	605 639

SECTION DESCRIPTION & COMMENTS:

1.5 m Sand and Gravel: Stratified, moderately sorted, sand to pebble gravel.

Bedrock: Sandstone.

The deposit is shallow and has a lobate surface expression. It may have originated as a subaqueous outwash fan. Till (or diamicton) has been found interstratified with sand in a road cut about 1 km SE of I10-6, along the old highway 11. Some marine reworking probably took place during the transgression that followed deglaciation.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Limited

LOCATION #:	I10-7	NTS:	21 I/10
Type of Deposit:	Outwash	County:	Kent
Exposure Type:	Pit	Parish:	Weldford
Status:	Active on demand	UTM:	512 565

SECTION DESCRIPTION & COMMENTS:

A small pit opened in an outwash delta displays mostly slumped and vegetation-covered sections. Fresh cuts show topset beds consisting of pebble gravel to gravelly sand overlying foresets of medium-grained sand and red clay silt. An easterly paleoflow direction was recorded. Clasts consist mainly of soft Carboniferous lithologies. One epidotized metasediment (?) erratic may be of Caledonian origin.

The sample was obtained from the sandy foreset beds.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing		100.0	98.8	95.9	93.7	90.8	85.1	51.1	14.7	6.9

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
11	2	2.5	50,000

LOCATION #:	I10-8	NTS:	21 I/10
Type of Deposit:	Ice-contact	County:	Kent
Exposure Type:	Pit	Parish:	Wellington
Status:	Active on demand	UTM:	684 513

SECTION DESCRIPTION & COMMENTS:

Sections up to 5 m high are exposed in this small, partly flooded borrow pit. The active face displayed stratified, moderately loose and well-sorted medium-grained sand and reddish brown, moderately to very compact pebbly silty sand till (diamicton). Clasts within the till are subangular to subrounded and consist mainly of soft Carboniferous lithologies. Large, completely weathered sandstone blocks were noted at the base of the section. Till caps the deposit in one section of the pit and bedrock outcrops on the floor.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES: N/A

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable

APPENDIX I

SITE DESCRIPTIONS

ROGERSVILLE MAP AREA

21 I/11

LOCATION #:	I11-1	NTS:	21 I/11
Type of Deposit:	Ice-contact	County:	Northumberland
Exposure Type:	Pit	Parish:	Rogersville
Status:	Abandoned	UTM:	107 794

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

0.5 m Gravel: Clean, medium to very coarse gravel, with a matrix of predominantly very fine to fine gravel with medium to very coarse sand; clasts are subangular to subrounded.

0.5 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.5 m.

This small deposit, possibly a kame terrace, contains an anomalous abundance of good-quality lithotypes. Material of similar character in the Barnaby River valley to the west was rated as suitable for use as base course aggregate by DOT (Seaman, 1983). Unfortunately, reserves are limited.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	55.7	46.6	30.2	19.1	11.4	6.9	3.8	1.9	1.3	0.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	26%	Sound Lithotypes	74%
sandstone 21; metasediments 2; conglomerate 1; chert 1; schist 1		metasediments 31; quartzite 18; sandstone 9; felsic intrusive 7; mafic extrusive 3; quartz 3; gneiss 2; felsic extrusive 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #:	I11-2	NTS:	21 I/11
Type of Deposit:	Glaciofluvial outwash	County:	Northumberland
Exposure Type:	Pit	Parish:	Rogersville
Status:	Inactive	UTM:	110 757

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.1 m Sandy Gravel: Fine to coarse gravel with predominantly medium to coarse sand; clasts are subrounded to rounded.

0.5 m Slump Covered: Probably material similar to that above; the pit floor is underlain by dark brown clayey sand till.

Maximum clast size in the pit area is 0.5 m.

This outwash body occurs as a blanket over till. Due to the flatness of the regional surface, its boundaries are indefinite. Material thickness varies from less than 1 m to approximately 2.5 m. The material appears to be generally coarser than that described in the northern part of the pit area, and finer in the western part.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	57.9	53.8	42.1	35.1	31.2	28.1	17.8	3.6	1.1	0.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	80%	Sound Lithotypes	20%
sandstone 80		sandstone 15; felsic intrusive 3; greywacke 1; metasediment 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
11	5	1	50,000

LOCATION #: I11-3 NTS: 21 I/11
 Type of Deposit: Glaciofluvial outwash County: Kent
 Exposure Type: Road cut Parish: Acadieville
 Status: Undeveloped UTM: 226 738

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

0.8 m Sandy Gravel: Cobbly, predominantly medium to very coarse gravel with silty very fine to very coarse sand; clasts are subrounded to rounded and generally platy; maximum clast size is 0.3 m; some clasts are coated with clay.

1.0 m Slump Covered: Assumed to be material as above.

A small, inactive pit approximately 1.0 to 1.5 m deep is present just to the south of the above section. The material appears similar, and is very poor.

As with most of the outwash deposits in the study area, the boundaries are indefinite.

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	52.8	35.8	33.7	27.4	21.9	19.1	16.8	13.1	9.0	6.8	5.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	60%	Sound Lithotypes	40%
sandstone 60		sandstone 40	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
21	15	1	150,000

LOCATION #:	I11-4	NTS:	21 I/11
Type of Deposit:	Glaciofluvial outwash	County:	Kent
Exposure Type:	Pit	Parish:	Acadieville
Status:	Inactive	UTM:	272 775

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

1.6 m Sand: Predominantly clean, very fine to fine sand, with a beds (approximately 0.3 m thick) of fine to medium sand; minor very thin silty bands are present.

- Till: Dense reddish brown till.

The material in this small deposit is extremely variable in thickness. Approximately 10 m west of the above section, the till extends to the surface. Locally, minor gravel is present. Two large sandstone boulders were observed in the sand.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing						99.7	99.2	75.5	38.3	19.2

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Minimal

LOCATION #: I11-5 NTS: 21 I/11
 Type of Deposit: Glaciofluvial outwash County: Kent
 Exposure Type: Pit Parish: Acadieville
 Status: Abandoned UTM: 307 774

SECTION DESCRIPTION & COMMENTS:

0.4 m Soil: Silty soil, developed on the underlying material.

0.3 m Sandy Gravel: Predominantly medium to very coarse gravel with fine to medium sand.

1.0 m Gravelly Sand: Horizontally stratified, predominantly medium to coarse sand, with bands of very fine to very coarse gravel; the sample was obtained from this unit.

1.8 m Slump Covered: Assumed to be material as above.

Clasts in the deposit are subrounded to well rounded. Maximum clast size is 0.4 m. A small subsidiary lift extends approximately 1.5 m below the level of the main pit; its base is at the water table. Most of the material at the surface of the deposit appears to be a sandy gravel, as described above.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	84.8	83.7	78.5	74.1	69.7	60.4	26.7	6.1	3.1	2.4

LITHOLOGIC ANALYSIS:

<u>Unsound Lithotypes</u>	<u>87%</u>	<u>Sound Lithotypes</u>	<u>13%</u>
sandstone 87		sandstone 13	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
25	20	2	400,000

LOCATION #:	I11-6	NTS:	21 I/11
Type of Deposit:	Ice-contact	County:	Kent
Exposure Type:	Road cut	Parish:	Huskisson
Status:	Undeveloped	UTM:	169 594

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

0.4 m Sandy Gravel: Very poorly sorted, bouldery, cobbly, coarse to very coarse gravel with fine to coarse sand; clasts are subrounded to well rounded, maximum clast size is 0.8 m; a large boulder is present at the base of the section.

This section is in a small esker ridge. It is approximately 3 m high at this point, with a maximum height of about 5 m to the south. The ridge is about 30 m wide.

Minor outwash flanks the esker. Between the esker and Upper Meadow Brook, 0 to 1 m of cobbly, sandy, gravel outwash overlies bedrock. Reserves of such material are probably minimal.

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	73.0	31.2	29.8	26.7	25.0	23.5	22.1	17.6	6.5	2.6	1.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	89%	Sound Lithotypes	11%
sandstone 88; chert 1		sandstone 8, felsic intrusive 2; mafic intrusive 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Limited

LOCATION #:	I11-7	NTS:	21 I/11
Type of Deposit:	Ancient alluvium	County:	Kent
Exposure Type:	Pit	Parish:	St. Louis
Status:	Active on demand	UTM:	407 741

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

1.5 m Sand: Horizontally stratified, predominantly clean, fine to medium sand, with minor beds of well-sorted, medium sand and of silty very fine sand; a 5 cm thick bed of angular to subangular gravel is present 0.6 m below the top of the unit.

0.5 m Slump Covered: Assumed to be material similar to that above; a layer of boulders is present; maximum clast size is 1.3 m.

The above section is in the alluvial terrace surface at the southern end of the pit. The inactive portion of the pit in the valley flank, to the north, is in approximately 7 m of similar material. This material could be of deltaic origin.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing		96.2	94.9	94.7	94.3	93.9	91.9	50.5	23.8	15.2

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable
			Limited

LOCATION #:	111-8	NTS:	21 I/11
Type of Deposit:	Ice-contact	County:	Kent
Exposure Type:	Pit	Parish:	St. Louis
Status:	Active	UTM:	398 733

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Estimated thickness; surface has been scraped.

2.4 m Pebbly Cobble Gravel: Predominantly coarse to very coarse pebbly, cobble gravel, with a few small boulders; the upper portion contains minor lenses of very fine to medium gravel with medium to very coarse sand; the lower portion contains minor silty horizons; clasts are subrounded to well rounded, and consist almost totally of sandstone; the sample was obtained from the lower portion of the unit.

2.5 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.6 m.

This pit may be in a fan associated with a small esker segment. The deposit is surrounded by exposures of weathered sandstone, so remaining reserves are limited.

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	33.8	18.6	17.3	14.0	11.8	10.7	9.8	8.1	5.2	3.2	2.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	91%	Sound Lithotypes	9%
sandstone 91		sandstone 9	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: I11-9
Type of Deposit: Ice-contact
Exposure Type: Pit
Status: Active on demand

NTS: 21 I/11
County: Kent
Parish: St. Louis
UTM: 358 696

SECTION DESCRIPTION & COMMENTS:

Crest Section (A)

0.5 m Soil: Estimated thickness; surface has been scraped; 0.2 m remaining is developed in a slightly silty sandy gravel.

2.9 m Sand: Clean, cross-bedded, fine to medium sand; palaeoflow direction was north-northwestward.

1.6 m Slump Covered: A cobbly, sandy gravel is present at the base of the sand; the underlying material may be similar.

The deposit consists of a low, central ridge flanked by flat areas. The above section is in the core of the ridge. The thin sandy gravel that caps the sand in this area, becomes much thicker on the flanks of the ridge.

Ridge Flank Section (B)

0.5 m Soil: Silty soil, developed on the underlying material.

1.8 m Sandy Gravel: Crudely stratified, medium to very coarse gravel with fine to medium sand, and with a few cobbles and small boulders in the upper 0.3 m and lower

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing											
A						99.9	99.7	91.9	29.2	6.9	2.5
B	95.4	64.3	55.8	41.0	32.5	27.8	25.8	22.1	13.9	9.6	7.5

LITHOLOGIC ANALYSIS:

<u>Unsound Lithotypes</u>	<u>89%</u>	<u>Sound Lithotypes</u>	<u>11%</u>
sandstone 89		sandstone 11	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
120	80	2	1.6 million

LOCATION #: I11-9 (Continued)

SECTION DESCRIPTION & COMMENTS:

0.8 m; the unit grades downward from clean to silty and slightly clayey; most clasts in the lower half of the unit are clay coated.

0.9 m Slump Covered: Assumed to be material as above.

The above section is exposed in a subsidiary lift on the west side of the ridge. Adjacent to the above section, a 1.7 m thick channel cuts through the sandy gravel. The channel fill consists of 0.4 m of sandy silt overlying stratified very fine to fine sand grading downward into fine to medium sand; thin silty bands are present throughout the sand.

Flanking Flat Section (composite)

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.1 m Sandy Gravel, or Sand: A longitudinal bar core of cobbly, medium to very coarse gravel with fine to medium sand interfingers (to the southwest) with a trough cross-stratified channel fill of clean medium sand, capped by 0.3 to 0.5 m of gravelly, fine to coarse sand with a few cobbles.

0.4 m Gravelly Sand: Clean, stratified, predominantly medium sand, with minor gravelly bands.

0.2 m Sandy Gravel: Poorly sorted, very fine to very coarse gravel with fine to medium sand.

1.1 m Slump Covered: Assumed to be material as above.

Minor coal fragments are present in some of the sand units in the deposit. Clasts are subrounded to well rounded. Maximum clast size in the pit area is 0.4 m.

This deposit comprises a large ice-contact complex with associated outwash, related to the Kent Lake esker system to the south (I11-10, 11). As indicated by the section descriptions, the material is highly variable in character. However, toward the northeast, it appears to be predominantly fine. The small pit here (UTM 364 705) exposes approximately 2 to 3 m of fine sand, with a thin sandy gravel cap.

LOCATION #: I11-10

NTS: 21 I/11

Type of Deposit: Ice-contact

County: Kent

Exposure Type: Pit

Parish: St. Charles

Status: Abandoned

UTM: 363 656

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.0 m Sandy Gravel: Cobbly, coarse to very coarse gravel with medium to coarse sand; a thin (10 to 20 cm thick) bed of clean, well-sorted fine to medium sand is present near the top of the unit; the cobbles are concentrated in discrete bands; clasts are subrounded to well rounded; maximum clast size is 0.25 m; the sample is exclusive of the sand layer.

A small test pit is present in the esker further to the south. At this site, the exposure consists of 0.6 m of soil over 1.6 m of fine to medium sand with a few pebbles, and becomes slightly silty with depth. Minor bands of coal particles are present.

This esker segment is part of the Kent Lake esker system that extends from the Harcourt area up to the Kouchibouguacis River (I6-1, 3; I11-9, 11). It is flanked on both sides by a network of ablation moraines.

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	77.0	35.6	34.0	28.6	24.9	21.9	19.4	14.6	7.5	4.0	2.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	82%	Sound Lithotypes	18%
sandstone 82		sandstone 17; mafic intrusive 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
27	20	2	400,000

LOCATION #:	I11-11	NTS:	21 I/11
Type of Deposit:	Ice-contact	County:	Kent
Exposure Type:	Pit	Parish:	Weldford
Status:	Inactive	UTM:	343 596

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

0.9 m Gravel: Cobbly, medium to very coarse gravel with a matrix of fine to medium sand. Clasts are subangular to subrounded, and many are platy; Sample A was obtained from this unit.

9.6 m Slump Covered: To the base of the lower lift.

The pit has been developed in two lifts. The upper lift is approximately 4 to 5 m high. The material in the southern portion of the pit is as described above. In the northern portion, the material is similar, but is silty with some clay.

Two cuts through the lower lift expose sand. A section dug in one of the cuts exposed 1.3 m of clean, well-sorted fine to medium sand with minor thin gravel layers in the upper third (Sample B). Gravel may be present below the sand.

This deposit forms a plug in the small valley of Beaver Pond Brook. It does not appear to have a significant surface area, though detailed test pitting would be required to confirm this. It is not an esker ridge, as indicated by Rampton and Paradis (1981a), though it is probably related to the Kent Lake esker system (see also I11-10).

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing											
A	70.9	34.5	29.0	19.5	17.0	16.1	15.7	14.4	10.1	4.5	2.2
B			98.6	97.4	94.6	92.4	90.7	81.4	21.3	4.6	2.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	99%	Sound Lithotypes	1%
sandstone 99		sandstone 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
I11-11			Limited
Esker system to the south	35	2	700,000

LOCATION #: I11-11 (Continued)

SECTION DESCRIPTION & COMMENTS:

Reserves are also presented for the esker segments and related ice-contact deposits to the south of the Bass River. These deposits are not well exposed. However, two shallow, hand-dug test pits in road cuts indicate that the material is variable; one exposed fine sand, the other cobbly sandy gravel. The material is probably similar to that found elsewhere in the Kent Lake esker system (see I11-9, 10; I6-1, 3); i.e., of generally poor to very poor quality.

LOCATION #: I11-12
Type of Deposit: Ice-contact
Exposure Type: Pit
Status: Abandoned

NTS: 21 I/11
County: Kent
Parish: St. Charles
UTM: 457 712

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.9 m Sandy Gravel: Crudely horizontally stratified, fine to coarse gravel with medium to coarse sand; clasts are subrounded to rounded; Sample A was obtained from this unit.

0.7 m Sand: Clean, well-sorted medium sand, with minor, very thin gravelly layers; Sample B was obtained from this unit.

1.8 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.2 m.

This small deposit appears to be a small ice-contact ridge. Alternatively, it could be a small deltaic deposit. Its workable reserves are limited by the presence of a cottage behind the pit, in the centre of the deposit.

Similar material may be present in what appears from the aerial photographs to be a very low, narrow esker approximately 2 km to the north.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										
A	84.6	81.4	70.2	62.3	57.7	53.3	39.5	8.9	3.6	2.2
B		98.3	95.7	94.1	92.2	89.3	78.7	20.9	2.4	0.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	89%	Sound Lithotypes	11%
sandstone 88; chert 1		sandstone 3; quartzite 2; quartz 2; felsic intrusive 1; mafic intrusive 1; greywacke 1; metasediment 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: I11-13 NTS: 21 I/11
 Type of Deposit: Glaciofluvial outwash County: Kent
 Exposure Type: Pit Parish: Weldford
 Status: Abandoned UTM: 393 562

SECTION DESCRIPTION & COMMENTS:

East Section (A)

0.5 m Soil: Gravelly soil, developed on the underlying material.

1.5 m Sand: Faintly stratified, clean, well-sorted fine to medium sand, with minor very thin bands (1 clast thick) of medium gravel.

2.6 m Slump Covered: Assumed to be material as above.

West Section (B)

0.4 m Soil: Silty soil, developed on the underlying material.

0.6 m Sandy Gravel: Silty, cobbly, medium to very coarse gravel, with fine to very coarse sand; clasts are subrounded to rounded, and many are platy.

1.5 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.3 m.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										
A			97.9	97.1	96.5	95.2	81.5	22.9	2.5	1.0
B	53.7	45.9	28.8	21.4	18.5	15.6	11.2	6.2	4.0	3.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	98%	Sound Lithotypes	2%
sandstone 98		sandstone 2	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: I11-13 (Continued)

SECTION DESCRIPTION & COMMENTS:

The pit area was tested by DOT in 1960. Their results for four samples are summarized below:

Mechanical Analysis:

between 37.0 and 43.9% passing 4.75 mm (40.7% average)

between 4.3 and 9.1% passing 75 μ m (6.7% average)

Los Angeles abrasion loss: 80.6 to 84.9% (82.8% average)

Recommended for borrow usage only.

This small deposit is of indeterminate extent. The small pit to the east contains approximately 1.5 m of sandy gravel; the one to the south exposes 1 to 3 m of predominantly sand. Between these two pits, weathered bedrock is exposed. These materials may be remnants of a small delta.

APPENDIX J

SITE DESCRIPTIONS

KOUCHIBOUGUAC MAP AREA

21 I/14

LOCATION #: I14-1

NTS: 21 I/14

Type of Deposit: Ice-contact

County: Northumberland

Exposure Type: Pit

Parish: Chatham

Status: Inactive

UTM: 109 071

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.1 m Sandy Gravel: Crudely stratified, predominantly fine to coarse gravel with fine to coarse sand; clasts are subrounded to rounded.

0.5 m Slump Covered: Assumed to be material as above, sandstone bedrock is present at the base of the pit.

A number of granitic boulders are present in the pit. Maximum clast size is 0.7 m.

This deposit is a small esker segment.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	73.3	71.3	59.5	51.8	47.2	42.2	32.1	19.6	9.2	5.0

LITHOLOGIC ANALYSIS:

<u>Unsound Lithotypes</u>	<u>77%</u>	<u>Sound Lithotypes</u>	<u>23%</u>
sandstone 76; schist 1		sandstone 11; felsic intrusive 6; greywacke 2; metasediments 2; siltstone 1; gneiss 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #:	114-2	NTS:	21 I/14
Type of Deposit:	Glaciofluvial outwash	County:	Northumberland
Exposure Type:	Pit	Parish:	Rogersville
Status:	Active on demand	UTM:	159 896

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Slightly silty soil, developed on the underlying material.

3.7 m Sandy Gravel: Very crudely stratified, cobbly very fine to very coarse gravel, with medium to very coarse sand; clasts are subrounded to rounded.

1.4 m Slump Covered: Assumed to be material as above.

The above section is in the deepest pit of an extensive pit complex. The deposit is a broad fan, possibly of deltaic origin. It could also be, at least in part, of ice-contact origin, since a thin (0.3 m thick) clayey till lens is present in the southern portion of the southernmost pit. Material thickness is variable from approximately 1 to 6 m.

The deposit area has also been sampled by DOT (1967, 1975). Their results, based on 19 samples, are as follows:

Mechanical Analysis:

between 24.5 and 63.0% passing 4.75 mm (average 43.9%)
between 1.5 and 8.0% passing 75 μ m (average 4.3%)

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing	55.1	52.4	42.4	34.2	25.1	16.6	9.9	6.3	4.5	3.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 69%

sandstone 58; siltstone 7;
metasediments 4

Sound Lithotypes 31%

felsic intrusive 9; metasediments 8;
sandstone 7; mafic extrusive 2;
quartzite 2; felsic extrusive 1;
siltstone 1; gneiss 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
30	20	2	400,000

LOCATION #: 114-2 (Continued)

SECTION DESCRIPTION & COMMENTS:

Los Angeles abrasion loss: 47.8 to 59.5% (54.3% average)

Recommended as borrow material only.

The reserve estimate pertains only to the portion of the deposit south of Baldwins Brook. No information is available for the area to the north.

LOCATION #: I14-3 NTS: 21 I/14
 Type of Deposit: Glaciofluvial outwash County: Northumberland
 Exposure Type: Pit Parish: Rogersville
 Status: Active on demand UTM: 128 865

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.2 m Sand: Clean, well-sorted, fine to medium sand.

0.3 m Gravelly Sand: Clean, fine to coarse sand with predominantly fine gravel.

1.4 m Sand: Clean, apparently massive, well-sorted, fine to medium sand.

The sample is a composite from the above units (excluding the soil). The pit has been worked down to the water table.

Maximum clast size in the pit area is 0.2 m.

This deposit appears to be composed predominantly of fine aggregate. It may be of deltaic origin, relating to maximum submergence in the Barnaby River valley.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing				98.9	98.3	97.4	88.7	36.0	3.4	2.1

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
20	14	1.5	210,000

LOCATION #: I14-4 NTS: 21 I/14
 Type of Deposit: Glaciofluvial outwash County: Northumberland
 Exposure Type: Pit Parish: Rogersville
 Status: Active on demand UTM: 125 848

SECTION DESCRIPTION & COMMENTS:

0.4 m Soil: Slightly silty soil, developed on the underlying material.

0.8 m Sandy Gravel: Stratified fine to coarse gravel with medium to coarse sand; contains minor thin beds of gravelly medium to very coarse sand, and of very fine to fine gravel.

0.7 m Gravelly Sand: Stratified medium to coarse sand with very fine to medium gravel; palaeoflow direction was north-northwestward.

0.2 Sand: Clean, well-sorted, medium sand; saturated, overlying free water.

The clasts in the deposit are subrounded to well rounded. Maximum clast size is 0.3 m. Minor coal particles are present in the gravelly sand unit.

The sample is a composite from the sandy gravel and gravelly sand units. Some parts of the pit area expose predominantly gravelly sand.

This deposit correlates with the deposit to the north (I14-3). The material becomes progressively coarser toward the southwest (see I14-5). Reserves are calculated for all of the outwash area to the south and east of the Barnaby River. Much of the area to the west of the river is boggy, though some aggregate material may be present.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	96.9	90.4	79.0	71.1	64.4	54.3	29.3	4.6	1.9	1.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 54%
 sandstone 47; felsic intrusive 4;
 siltstone 3

Sound Lithotypes 46%
 sandstone 19; felsic intrusive 11;
 siltstone 6; greywacke 4; felsic
 extrusive 2; metasediments 2; mafic
 intrusive 1; mafic extrusive 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
105	50	1.5	750,000

LOCATION #: I14-5 NTS: 21 I/14
 Type of Deposit: Glaciofluvial outwash County: Northumberland
 Exposure Type: Pit Parish: Rogersville
 Status: Active on demand UTM: 114 832

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Estimated thickness; surface has been scraped; 0.2 m remaining is silty, and developed on the underlying material.

1.2 m Sandy Gravel: Cobbly coarse to very coarse gravel with poorly sorted slightly to very silty sand; many of the clasts are coated with reddish clay; clasts are predominantly subrounded to rounded.

1.0 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.3 m.

This pit is one of many in an extensively pitted area. Most of the pits are inactive to abandoned. They seem to contain material generally similar to that described above, though in some locations a thin medium sand layer overlies the sandy gravel.

Testing of this deposit by DOT (1960, 1975) has provided the following test data, based on 21 samples:

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	89.5	37.2	34.0	26.9	22.9	20.9	18.9	15.7	12.3	9.4	7.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 69%

sandstone 67; siltstone 1; chert 1

Sound Lithotypes 31%

sandstone 16; metasediments 5; felsic
 intrusive 3; siltstone 2; quartz 2;
 mafic extrusive 1; greywacke 1;
 gneiss 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			See I14-4

LOCATION #: I14-5 (Continued)

SECTION DESCRIPTION & COMMENTS:

Mechanical Analysis:

between 25 and 63% passing 4.75 mm (average 38%)

between 4.6 and 10.8% passing 75 μ m (average 6.5%)

Los Angeles abrasion loss: 58.3 to 72.8% (65.5% average)

Recommended for use as borrow, with local potential for very marginal subbase material.

This portion of the deposit probably consists of a series of longitudinal bars, in which the pits are developed. The intervening braided stream channels are low, wet areas. It is possible that the deposit could extend to the southwest, below West Collette, as indicated by Rampton and Paradis (1981b). There are boggy channels here, with intervening higher areas, that could be outwash. Alternatively, they could be erosional features. Till was observed to the south of the highway, immediately to the east of Barnaby River, indicating the limited width of the deposit.

Estimated workable reserves for this area are included with those for I14-4.

LOCATION #:	I14-6	NTS:	21 I/14
Type of Deposit:	Ice-contact	County:	Northumberland
Exposure Type:	Pit	Parish:	Rogersville
Status:	Inactive	UTM:	125 838

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

1.2 m Gravel: Cobbly coarse to very coarse gravel, with a matrix of poorly sorted sand and silt; clasts are subangular to rounded.

6.1 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.6 m.

This deposit appears to be a kame terrace flanking the bedrock surface. A small area of sand was observed in one part of the pit. DOT (1967) testing indicates that most of the material may be somewhat finer than that described above.

This DOT (1967) test data for the pit area is as follows (for 13 samples):

Mechanical Analysis:

between 30.3 and 58.9% passing 4.75 mm (average 46.6%)
between 4.0 and 12.5% passing 75 μ m (average 7.1%)

Los Angeles abrasion loss: 59.5 to 65.3% (62.8% average)

Recommended for borrow usage only.

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing	65.8	27.8	25.4	19.2	15.2	12.5	11.1	10.0	9.1	7.7	5.4

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	64%	Sound Lithotypes	36%
sandstone 62; siltstone 1; metasediment 1		sandstone 10; greywacke 10; felsic intrusive 5; metasediments 5; mafic extrusive 2; mafic intrusive 1; siltstone 1; quartz 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
9	5	4	200,000

LOCATION #: I14-7

NTS: 21 I/14

Type of Deposit: Ice-contact

County: Northumberland

Exposure Type: Pit

Parish: Rogersville

Status: Inactive

UTM: 156 821

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

1.1 m Gravel: Very crudely horizontally stratified medium to very coarse gravel, with minor medium to very coarse sand; clasts are predominantly subrounded.

1.7 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.3 m. The above section, from the core of the ridge, is representative of most of the pit. However, at the eastern end, it is finer, including a sandy very fine to medium gravel, and a fine to medium sand (both poorly exposed).

This pit is in a low ridge, possibly an esker segment, in a gently rolling area, in which two other areas of aggregate have been noted. The extent of these deposits is indeterminate from the aerial photographs.

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	96.1	45.4	40.1	25.2	18.0	13.5	10.0	6.0	3.5	2.1	1.3

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	88%	Sound Lithotypes	12%
sandstone 81; slate 3; chert 2; metasediment 1; schist 1		metasediments 5; felsic intrusive 4; sandstone 2; quartz 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Limited
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LOCATION #:	I14-8	NTS:	21 I/14
Type of Deposit:	Glaciofluvial outwash	County:	Northumberland
Exposure Type:	Pit	Parish:	Rogersville
Status:	Active on demand	UTM:	180 849

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.4 m Gravel: Cobbly coarse to very coarse gravel, with a matrix of predominantly medium to coarse sand; clasts are subrounded to rounded.

0.8 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.6 m. The maximum depth of the pit is 3.0 m.

DOT (1961) testing of the area gave the following results, based on 7 samples:

Mechanical Analysis:

between 23.9 and 38.4% passing 4.75 mm (average 29.2%)

between 0.9 and 1.6% passing 75 μ m (average 1.3%)

Los Angeles abrasion loss: 70.5 to 73.1% (71.8%)

This deposit may be a segment of an outwash deposit that extends along Hovel Brook to the Bay du Vin River. There is no access to most of this area, and thus the presence

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing	62.5	29.7	27.1	20.7	17.1	15.1	12.7	8.2	4.7	3.0	2.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	84%	Sound Lithotypes	16%
sandstone 84		sandstone 6; metasediments 6; felsic intrusive 3; greywacke 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
14	14	1	140,000

LOCATION #: 114-8. (Continued)

SECTION DESCRIPTION & COMMENTS:

of aggregate is only inferred. The water table is relatively high throughout much of the area (the pit in its western end is flooded), so the workable thickness of any aggregate present may not be great. Due to the above uncertainties, reserves are calculated only for the small segment of the deposit containing the sampled pit.

LOCATION #:	114-9	NTS:	21 I/14
Type of Deposit:	Ancient alluvium	County:	Northumberland
Exposure Type:	Pit	Parish:	Glenelg
Status:	Abandoned	UTM:	238 909

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Silty soil, developed in a gravelly sand.

0.2 m Sand: Clean, well-sorted, fine to medium sand.

0.3 m Sandy Gravel: Very fine to medium gravel with medium to coarse sand; clasts are subrounded to well rounded; the sample was obtained from this unit; the water table is at the base of the section.

Maximum clast size in the pit area is 15 cm.

This small deposit lies between a bog to the north and the Bay du Vin River to the south. The material is probably representative of any other small deposits of similar origin along the river.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	96.6	93.2	82.4	70.1	59.9	51.0	28.0	6.6	2.6	1.6

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	58%	Sound Lithotypes	42%
sandstone 56; siltstone 2		felsic intrusive 20; sandstone 6; felsic extrusive 4; mafic extrusive 4; mafic intrusive 2; siltstone 2; greywacke 2; quartzite 2	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: I14-10 NTS: 21 I/14
 Type of Deposit: Glaciofluvial outwash County: Northumberland
 Exposure Type: Pit Parish: Glenelg
 Status: Active on demand UTM: 284 997
 (lightly)

SECTION DESCRIPTION & COMMENTS:

Southeast Section (A)

0.5 m Soil: Slightly silty soil, developed in a slightly gravelly sand.

1.5 m Sand and Gravel: Interbedded, stratified gravelly sands, sandy gravels and gravels; gravel beds are thin (2 to 10 cm thick) and consist of very fine to medium gravel; sandy gravel beds (10 to 30 cm thick) are dominant in the upper half of the section, and consist of very fine to coarse gravel with fine to coarse sand; gravelly sand beds (10 to 30 cm thick) are dominant in the lower half of the section, and consist of medium to very coarse sand with very fine to medium gravel; clasts are subrounded to well rounded; the palaeoflow direction was northeastward.

0.5 m Water: The base of the pit was flooded at the time of the visit (June, 1984). Fine to medium sand is present just below the water level, and may extend to depth.

Northwest Section (B)

0.5 m Soil: Slightly silty soil, developed on the underlying material.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										
A	96.8	92.8	76.4	56.9	42.0	32.0	21.5	9.9	4.0	2.6
B				99.9	99.5	98.3	90.5	50.2	17.1	7.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 65%

sandstone 64; chert 1

Sound Lithotypes 35%

sandstone 13; greywacke 9; felsic
 intrusive 4; quartz 3; siltstone 2;
 mafic intrusive 1; mafic extrusive 1;
 metasediment 1; gneiss 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
90	70	1	700,000

LOCATION #: 114-10 (Continued)

SECTION DESCRIPTION & COMMENTS:

0.9 m Sand: Faintly stratified, clean, interbedded, medium sand and very fine to medium sand.

0.5 m Silty Sand: Stratified, interbedded, silty very fine to fine sand and clean to slightly silty very fine to medium sand; some of the silty bands are also slightly clayey; silty sections comprise approximately 30% of the unit.

The maximum clast size in the pit area is 15 cm. Material similar to that described in Section B above is present in the pit on the east side of the highway (UTM 287 998).

DOT (1970) testing of the pit area provides the following results:

Mechanical Analysis: sand (12 samples)
between 95.4 and 100.0% passing 4.75 mm (average 99.2%)
between 1.5 and 17.0% passing 75 μ m (average 9.8%)

gravelly sand (1 sample)
72.4% passing 4.75 mm; 8.7% passing 75 μ m.

Recommended for borrow, and as possible filter sand, with some of the less silty material suitable for blending sand.

This deposit is probably of marginal marine origin, marking the maximum extent of submergence in the Little Black River valley. The deposit boundaries indicated are indefinite.

LOCATION #: I14-11

NTS: 21 I/14

Type of Deposit: Ice-contact

County: Northumberland

Exposure Type: Road cut

Parish: Glenelg

Status: Undeveloped

UTM: 364 002

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

0.5 m Sandy Gravel: Predominantly medium to very coarse gravel with fine to medium sand, and a few cobbles; Sample A was obtained from this unit.

0.7 m Gravelly Sand: Clean, well-sorted fine to medium sand with several thin gravelly layers; Sample B was obtained from this unit.

Clasts in the section are subrounded to well rounded. Maximum clast size is 0.2 m. The above section is on the west flank of the ridge. The surface at the crest is cobbly and bouldery. The pit to the west, approximately 4 m deep, is badly overgrown.

This deposit is a large esker ridge. Maximum height of the esker exceeds 7 m. The material is expected to be highly variable, as is typical of such deposits. Reserves are not estimated for the two potential deposits to the west of the main deposit, since the presence of aggregate material in them has not been confirmed.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing										
A	55.8	48.5	37.3	32.5	31.0	30.0	27.2	11.2	3.5	2.0
B	91.8	89.0	84.5	82.1	81.0	79.2	71.5	25.0	2.7	1.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	71%	Sound Lithotypes	29%
sandstone 71		sandstone 18; felsic intrusive 5; greywacke 4; mafic intrusive 1; quartz 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
50	50	3	1.5 million

LOCATION #: I14-12
 Type of Deposit: Ice-contact
 Exposure Type: Pit
 Status: Active on demand

NTS: 21 I/14
 County: Kent
 Parish: Carleton
 UTM: 399 894

SECTION DESCRIPTION & COMMENTS:

Crest Section, Southern Pit

0.5 m Soil: Silty soil, developed on the underlying material.

0.5 m Silty Gravelly Sand: Well-sorted, very fine to fine sand with 1 to 2 cm thick silty bands occupying approximately 30% of the unit; a number of pebbles and a few cobbles are present.

3.1 m Sandy Gravel: Crudely stratified, poorly sorted, extremely variable sandy gravel; the gravel is predominantly medium to very coarse, with a few cobbles; the sand varies from medium to very coarse, to very silty, very fine to fine; Sample A was obtained from the lower part of this unit.

0.8 m Gravelly Sand: Stratified fine to coarse, predominantly medium, sand with silty bands, and minor gravel; Sample B was obtained from this unit.

3.0 m Slump Covered: Assumed to be sand or gravel; the base of the pit is flooded.

West Flank Section, Southern Pit

0.5 m Soil: Slightly silty soil, developed on the underlying material.
 (CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing											
A		55.5	52.8	45.4	42.6	40.6	38.2	28.6	13.8	7.3	5.2
B		91.6	91.6	90.7	89.1	87.8	85.1	67.8	25.0	8.9	5.0
C					99.3	98.7	98.3	92.5	40.8	8.0	3.3
D	58.4	33.2	32.2	30.6	29.8	29.2	28.2	21.6	9.0	4.1	2.4

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	47%	Sound Lithotypes	53%
sandstone 46; schist 1		sandstone 33; greywacke 13; felsic intrusive 4; mafic extrusive 1; quartzite 1; quartz 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
58	25	2	500,000

LOCATION #: I14-12 (Continued)

SECTION DESCRIPTION & COMMENTS:

0.2 m Gravelly Sand: A lens of fine to coarse sand with very fine to medium gravel.

1.4 m Sand: Stratified, well-sorted, fine to medium sand, with a 0.3 m thick cross-stratified bed of medium to coarse sand with a few small pebbles; palaeoflow direction was toward the south-southeast. Sample C was obtained from this unit.

0.2 m Gravelly Sand: Fine to coarse sand with predominantly fine to coarse gravel.

1.5 m Slump Covered: Assumed to be material as above.

The east flank section exposed sandy gravel, similar to Sample A, overlying very fine to medium sand with minor silty bands.

Crest Section, Central Pit

0.5 m Soil: Developed on the underlying material.

1.4 m Sandy Cobbly Gravel: Cobbly, predominantly coarse to very coarse gravel with fine to coarse sand; a few boulders are present; the unit appears massive; the majority of the clasts are sandstone. Sample D was obtained from this unit.

5.5 m Slump Covered: Assumed to be material as above; the base of the pit is at the level of the water table.

Both of the above pits are part of a pit complex in the Laketon esker. The clasts in this deposit are subrounded to well rounded. Maximum clast size is 0.7 m. A stockpile of crushed material was present in the southern pit.

DOT (1960, 1977) testing of the deposit has provided the following information:

Mechanical Analysis: sandy gravel (15 samples)
between 20 and 66% passing 4.75 mm (average 40%)
between 1.8 and 12.4% passing 75 μ m (average 5.8%)

gravelly sand (3 samples)
between 81 and 89% passing 4.75 mm (average 85%)
between 3.1 and 8.7% passing 75 μ m (average 5.8%)

Los Angeles abrasion loss: 57.0 to 64.0% (60.2% average)

Recommended for use as borrow and as marginal quality subbase.

Most of the thicker portions of this deposit have been depleted. Most of the remaining reserves are in the low ridges on the western side of the main esker ridge. Samples A, B, and C are more characteristic of this material than Sample D.

LOCATION #:	I14-13	NTS:	21 I/14
Type of Deposit:	Glaciofluvial outwash	County:	Kent
Exposure Type:	Pit	Parish:	Carleton
Status:	Inactive	UTM:	394 832

SECTION DESCRIPTION & COMMENTS:

0.4 m Soil: Slightly silty soil, developed on the underlying material.

0.3 m Gravelly Sand: Clean, fine to coarse sand, with well-rounded, very fine to medium gravel.

0.9 m Sand: Well-sorted, very fine to medium sand, with minor silty bands; the sample was obtained from this unit.

0.8 m Slump Covered: Assumed to be material as above.

This deposit is assumed to be an outwash deposit related to the limit of marine submergence. Alternatively, it could be of marine origin. It may be a good source for clean sand.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing				99.7	98.7	97.3	92.0	62.9	15.3	2.5

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
7	7	1	70,000

LOCATION #:	I14-14	NTS:	21 I/14
Type of Deposit:	Ancient alluvium	County:	Kent
Exposure Type:	Pit	Parish:	Carleton
Status:	Active on demand	UTM:	416 834

SECTION DESCRIPTION & COMMENTS:

Composite Section

0.5 m Soil: Slightly silty soil, slightly iron cemented, developed on the underlying material.

2.0 m Gravelly Sand: Faintly stratified, clean, well-sorted, medium to coarse sand, with very fine to coarse gravel.

0.8 m Sandy Gravel: Gravel, coarsening downward from very fine to coarse, to cobbly medium to very coarse, with medium to coarse sand, and a few boulders.

0.9 m Sand: Clean, well-sorted, medium to coarse sand, with a few isolated pebbles, cobbles and boulders.

0.7 m Slump Covered: Assumed to be material as above; the base of the pit is flooded.

The clasts in this deposit are subangular to rounded. Maximum clast size in the pit area is 0.7 m. The small, abandoned pit to the west of the small stream appears to consist of similar material.

DOT (1981) testing of the pit area provides the following data (based on 5 samples):
(CONTINUED)

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	89.8	88.7	86.4	83.7	81.6	76.1	29.4	6.0	2.2	1.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	63%	Sound Lithotypes	37%
sandstone 63		sandstone 33; mafic intrusive 2; felsic intrusive 1; felsic extrusive 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: I14-14 (Continued)

SECTION DESCRIPTION & COMMENTS:

Mechanical Analysis:

between 84 and 94% passing 4.75 mm (average 90%)
between 2.3 and 4.2% passing 75 μ m (average 3.0%)

Los Angeles abrasion loss: 81.3%

Recommended for use as borrow, filter material, blending sand, and possibly for winter sand.

The extent of this deposit appears to be limited. Bedrock is exposed along the road immediately to the south of the pit. The deposit lies at the mouth of an abandoned segment of the preglacial Kouchibouguac River channel. Similar material may be present elsewhere on the flanks of this channel. The bedding in the deposit suggests that flow was parallel to the slope, indicating that the deposit is probably alluvial rather than marine.

APPENDIX K

SITE DESCRIPTIONS

POINTE-SAPIN MAP AREA

21 I/15

LOCATION #: IL5-1
Type of Deposit: Marine
Exposure Type: Pit
Status: Abandoned

NTS: 21 I/15
County: Kent
Parish: Carleton
UTM: 479 888

SECTION DESCRIPTION & COMMENTS:

A 2 m road cut exposes well-sorted, medium sand and an abandoned pit that shows up to 3 m of fine sand; these deposits are associated with a landform that partially blocks the Black River valley. Although the presence of fine and well-sorted sediments suggests a marine origin, there may be a morainic core to the landform.

DOT (1960) tested the material. Results are summarized below.

Percentage finer than 75 μ m: range 0.6 to 17.1%; mode 1.7%
Los Angeles abrasion loss: range 64.8 to 81.8%; mode 75.8%
Recommended usage: borrow

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #:	I15-2	NTS:	21 I/15
Type of Deposit:	Marine	County:	Kent
Exposure Type:	Pits	Parish:	Saint-Louis
Status:	Active on demand	UTM:	478 806

SECTION DESCRIPTION & COMMENTS:

The road straddles the crest of a beach ridge. Pits on both sides of the road display between 2 and 3 m of sand and gravel over a sandstone bedrock.

At I15-2, sections are 2 to 3 m high and expose well-sorted, horizontally bedded clast-supported pebble gravel and medium sand. Clasts are well rounded and are almost all Carboniferous sandstone.

DOT (1960) tested the material. Results are summarized below:

Percentage finer than 75 μ m:	range 0.8 to 2.2%
Los Angeles abrasion loss:	range 81.2 to 87.6%
Proposed usage:	fine cement aggregate

The reserves of this small deposit are limited by housing development.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
		2.5	Limited

APPENDIX L

SITE DESCRIPTIONS

MINTO MAP AREA

21 J/1

LOCATION #: J1-1
Type of Deposit: Marine
Exposure Type: Pit
Status: Abandoned

NTS: 21 J/1
County: Sunbury
Parish: Northfield
UTM: 252 082

SECTION DESCRIPTION & COMMENTS:

0.6 m Soil: Upper half silty soil, lower half oxidized soil, developed on the underlying material.

0.8 m Sand: Clean, fine to medium sand, with a few very fine to medium gravel clasts.

- Till: Dense, reddish brown, clayey sand till.

Maximum clast size is 1.0 m. A number of boulders, predominantly sandstone, are scattered throughout the pit area. This pit, plus a new one (partly flooded) immediately to the southeast, is adjacent to a coal tailings pile, that may also have been used for aggregate. This deposit has no definable extent on the aerial photographs, and probably has only limited reserves.

To the east of Newcastle Bridge, an area of alluvium has been mapped. This deposit includes some marine or lacustrine shallow-water material, and may overlies deep-water clays. There are two abandoned pits in this deposit. The eastern pit (UTM 294 071),

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing			99.2	98.1	96.5	94.4	78.1	28.5	2.8	0.1

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
J1-1			Limited
Ancient alluvium to the east - 37	35	1	350,000

LOCATION #: J1-1 (Continued)

SECTION DESCRIPTION & COMMENTS:

approximately 2 to 4 m deep, contains trough cross-bedded, fine to medium sand with minor very fine gravel, and with numerous clay seams. Palaeoflow direction was toward the southeast.

The western pit (UTM 287 074) exposed approximately 2 m of fine sand, with a few clay seams up to 15 cm thick. DOT (1972) test results for the pit area are as follows (based on 5 samples):

Mechanical Analysis:

between 95 and 100% passing 4.75 mm (average 98.6%)
between 5.4 and 13.5% passing 75 μ m (average 9.0%)

Recommended for use as borrow, and as blending and filter material.

LOCATION #:	J1-2	NTS:	21 J/1
Type of Deposit:	Ice-contact	County:	Sunbury
Exposure Type:	Pit	Parish:	Northfield
Status:	Active on demand	UTM:	241 063

SECTION DESCRIPTION & COMMENTS:

0.5 m Till: Estimated thickness; reddish brown clayey sand till, partially scraped off.

1.0 to 2.3 m Sandy Gravel: Indurated, very fine to coarse gravel with medium to very coarse sand; contains a few coarser, slightly cobbly beds; beds are large trough-fill units; clasts are subrounded to well rounded; Sample A was obtained from this unit.

1.7 to 3.0 m Sand: Variable trough cross-bedded sand; the material ranges from fine to medium sand, to gravelly medium to very coarse sand and contains minor beds of silty, very fine sand; coal fragments are present in the sand; Sample B was obtained from this unit.

Maximum clast size in the pit area is 0.5 m. The palaeoflow direction appears to have been southerly.

A pit to the east (UTM 247 064), and another to the south of Gilchrist Brook (UTM 241 059), exposes up to 1 m of till overlying materials similar to those described above. In the first pit, coarse aggregate is more abundant, while in the latter, it is the fine aggregate that is predominant. Both contain approximately 3 to 4 m of workable material.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing											
A	94.9	83.2	77.3	60.1	48.3	37.5	26.7	14.6	7.5	5.5	4.6
B				97.7	91.8	84.6	74.0	46.2	15.5	6.3	2.9

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	65%	Sound Lithotypes	35%
sandstone 52; siltstone 9; metasediments 2; felsic intrusive 1; chert 1		sandstone 20; quartzite 6; mafic extrusive 3; felsic intrusive 2; mafic intrusive 2; felsic extrusive 1; metasediment 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			Unknown

LOCATION #: J1-2 (Continued)

SECTION DESCRIPTION & COMMENTS:

Due to the overlying cap of till, the extent of this deposit cannot be accurately determined. It could be much larger or much smaller than the approximate boundaries indicated on the map. Detailed test pitting or boring would be required to accurately define the deposit boundaries.

LOCATION #:	J1-3	NTS:	21 J/1
Type of Deposit:	Ice-contact	County:	Sunbury
Exposure Type:	Pit	Parish:	Sheffield
Status:	Inactive	UTM:	168 034

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.5 m Sand: Horizontally stratified fine to medium sand, with minor bands of fine to very coarse sand with very fine to fine gravel.

2.1 m Sandy Gravel: Up to 1 m of dense, cobbly, slightly silty, sandy, medium to very coarse gravel with a few boulders, overlying cross-bedded, very fine to coarse gravel with fine to very coarse sand, containing minor beds of medium to coarse sand; clasts are subrounded to rounded; the sample was obtained from the lower portion of this unit.

0.3 m Slump Covered: Assumed to be material as above; the water table is at the base of the pit.

Maximum clast size in the pit area is 0.6 m.

This pit is in a small esker segment. An abandoned, depleted pit to the southwest (UTM 165 030) may have been developed in similar material. Scattered occurrences of sand and gravel that may be of similar origin, are present to the north of the strip mine.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	89.0	87.7	75.7	61.0	50.3	43.3	32.7	16.8	9.6	6.0

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	71%	Sound Lithotypes	29%
sandstone 67; mafic intrusive 1; siltstone 1; chert 1; slate 1		sandstone 10; quartzite 5; mafic extrusive 4; metasediments 4; mafic intrusive 3; felsic intrusive 1; siltstone 1; greywacke 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³)
			probable
			Limited

LOCATION #: J1-3 (Continued)

SECTION DESCRIPTION & COMMENTS:

DOT (1975) test results for the area around the sampled pit are as follows (based on 5 samples):

Mechanical Analysis:

between 35 and 52% passing 4.75 mm (average 43.6%)

between 3.3 and 5.1% passing 75 μ m (average 4.3%)

Los Angeles abrasion loss: 33.7 to 35.9% (34.8% average)

Recommended for use as borrow, subbase, and base course (31.5 mm crushed) aggregate.

APPENDIX M

SITE DESCRIPTIONS

BOIESTOWN MAP AREA

21 J/8

LOCATION #:	J8-1	NTS:	21 J/8
Type of Deposit:	Ice-contact	County:	Northumberland
Exposure Type:	Pit	Parish:	Ludlow
Status:	Active on demand	UTM:	932 523

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Silty soil, developed on the underlying material.

1.8 m Sandy Gravel: Stratified, interbedded sandy gravels of variable character, with respect to clast size and sand content; the material is excessively silty, all clasts being coated; clasts are angular to subrounded.

1.5 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 1.2 m. A number of large boulders, predominantly granitic, are present, but none are exposed in the pit faces.

This deposit appears to be a kame terrace. The material can easily be mistaken for till due to its appearance in surface soil exposures.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	74.1	65.3	47.2	34.6	16.4	13.9	6.2	2.4	0.9	0.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	83%	Sound Lithotypes	17%
slate 54; metasediments 28; mafic extrusive 1		metasediments 7; quartz 6; greywacke 2; metavolcanics 2	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
21	15	2	300,000

LOCATION #:	J8-2	NTS:	21 J/8
Type of Deposit:	Glaciofluvial outwash	County:	Northumberland
Exposure Type:	Scraping	Parish:	Ludlow
Status:	Undeveloped	UTM:	987 492

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.7 m Sandy Gravel: Generally medium to very coarse gravel with medium to coarse sand, and a few cobbles; clasts are subangular to rounded; the sand is "granitic" in character.

0.3 m Slump Covered: Assumed to be material as above.

Maximum clast size in the pit area is 0.2 m.

The above section is approximately one third of the way down from the top of an outwash terrace. The terrace height is approximately 10 m, presumably all sand and gravel.

There are a series of outwash and alluvial terraces in the area, containing material of generally similar quality to that described above. Reserves are estimated in four
(CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	84.4	49.3	48.2	42.3	39.4	37.3	32.8	10.7	1.1	0.3	0.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	53%	Sound Lithotypes	47%
felsic intrusive 34; metasediments 13; sandstone 4; schist 2		metasediments 16; quartzite 11; felsic intrusive 8; mafic extrusive 3; quartz 3; sandstone 2; metavolcanics 2; felsic extrusive 1; siltstone 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
Upper outwash	14	14	8
Lower outwash	45	26	5
Adjacent ancient alluvium	62	38	1
Outwash to the west, north of the river	53	38	2

LOCATION #: J8-2 (Continued)

SECTION DESCRIPTION & COMMENTS:

parts: (1) for the upper level outwash from which the sample was obtained; (2) for the lower level outwash terrace immediately to the east; (3) for the flanking ancient alluvial deposits to the south; and (4) for the outwash deposits on the north side of the Southwest Miramichi River, north of Taxis River. The small outwash and alluvial deposits adjacent to the latter deposit, and upstream of it, have limited reserves.

DOT (1970) test data for the small outwash deposit at Porter Brook is as follows (based on 7 samples):

Mechanical Analysis:

between 32.5 and 44.3% passing 4.75 mm (average 37.0%)

between 0.4 and 1.0% passing 75 μ m (average 0.6%)

Los Angeles abrasion loss: 22.2%

Recommended for use as borrow and borderline subbase, due to erratic grading. Crushing could improve the grading of this material, but grading deficiencies would still exist.

LOCATION #:	J8-3	NTS:	21 J/8
Type of Deposit:	Glaciofluvial outwash	County:	Northumberland
Exposure Type:	Pit	Parish:	Ludlow
Status:	Active on demand (lightly)	UTM:	004 502

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Estimated thickness; surface has been scraped.

5.3 m Gravelly Sand: Horizontally stratified, medium to very coarse sand with predominantly very fine gravel; Sample A was obtained from this unit.

0.9 m Sandy Gravel: A tripartite unit; upper half is a slightly silty, slightly cobbly, medium to very coarse gravel with fine to medium sand; intermediate portion is a lens of gravelly sand, similar to that above, up to 0.2 m thick; lower portion is predominantly fine to coarse gravel with medium to coarse sand.

0.8 m Sand: Cross-bedded, well-sorted, medium sand, with minor very fine to medium gravel concentrated on the bedding planes.

0.6 m Gravel: Cobbly, very fine to very coarse gravel, with minor coarse to very coarse sand; Sample B was obtained from this unit.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing											
A					98.7	85.9	65.5	30.4	11.8	5.3	2.7
B	89.2	46.0	40.7	25.3	15.5	9.4	4.6	0.9	0.2	0.1	0.05

LITHOLOGIC ANALYSIS:

<u>Unsound Lithotypes</u>	<u>58%</u>	<u>Sound Lithotypes</u>	<u>42%</u>
metasediments 26; felsic intrusive 14;		metasediments 14; quartzite 10; felsic	
sandstone 12; mafic extrusive 2;		intrusive 5; quartz 4; sandstone 3;	
siltstone 2; felsic extrusive 1;		mafic extrusive 2; metavolcanic 2;	
metavolcanic 1		felsic extrusive 1; greywacke 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
J8-3	9	3	5
Upper outwash	59	18	5
Lower outwash	13	11	3
Taxis River outwash	extensive	20	2

LOCATION #: J8-3 (Continued)

SECTION DESCRIPTION & COMMENTS:

1.3 m Slump Covered: Assumed to be sand or gravel as above.

Clasts in the deposit are generally subrounded to rounded. Maximum clast size is 0.2 m.

This deposit may be a remnant of the intermediate level outwash present elsewhere in the Southwest Miramichi valley. Similar material is exposed in the pit in the terrace to the southwest (UTM 002 499). The material in this area is generally finer than similar material that is found elsewhere in the Southwest Miramichi valley.

The ice-contact deposit (probably an esker) and the outwash flanking and to the southwest of it contain predominantly coarse material. This material contains a high proportion of local sandstone clasts, and is thus of very poor quality. Sandstone is exposed at the surface to the south of the central portion of the ice-contact deposit (i.e. along the highway). The provincial park and the residential development in the area effectively prevent these deposits from being worked. The alluvial deposit in this area is also highly developed, and thus has only limited aggregate potential.

Estimated reserves are calculated for: the outwash segment containing the sampled pit, the high-level outwash to the south, the low-level outwash to the southeast, and the outwash deposits to the west along the Taxis River (most of which are sterilized by residential development).

LOCATION #: J8-4 NTS: 21 J/8
 Type of Deposit: Glaciofluvial outwash County: Northumberland
 Exposure Type: Pit Parish: Ludlow
 Status: Inactive UTM: 018 515

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on the underlying material.

0.5 m Sandy Gravel: Predominantly fine to coarse gravel with fine to coarse sand.

0.4 m Sand: Clean, horizontally bedded, predominantly medium sand.

0.5 m Sandy Gravel: Slightly cobbly, predominantly medium to very coarse gravel with coarse to very coarse sand; the sample was obtained from this unit.

3.1 m Slump Covered: Assumed to be sand or gravel, as above.

Clasts in the deposit are subrounded to rounded. Maximum clast size is 1.2 m (boulder-size), however, only 2 of these large boulders are present in the pit.

DOT (1976) test data for the pit area is as follows:

Mechanical Analysis: coarse aggregate (9 samples)
 between 32 and 65% passing 4.75 mm (average 40%)
 between 0.6 and 1.2% passing 75 μ m (average 0.9%)

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing	42.6	36.5	27.4	20.5	15.6	10.0	2.7	0.6	0.3	0.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 55%

felsic intrusive 29; metasediments 11;
 sandstone 8; mafic extrusive 3; mafic
 intrusive 2; metavolcanics 2

Sound Lithotypes 45%

metasediments 12; mafic extrusive 10;
 quartzite 6; felsic intrusive 5;
 felsic extrusive 4; quartz 4; gneiss 3;
 mafic intrusive 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
130	50	3	1.5 million

LOCATION #: J8-4 (Continued)

SECTION DESCRIPTION & COMMENTS:

fine aggregate (1 sample)
93% passing 4.75 mm; 0.9% passing 75 μ m

Los Angeles abrasion loss: 23.6 to 25.5% (24.6% average)

Recommended for use as borrow, subbase, base course (31.5 mm crushed), asphaltic concrete, and cover aggregate.

The extensively pitted area to the west has also been tested by DOT (1966, 1973). Results of this testing, based on 19 samples, are as follows:

Mechanical Analysis:

between 25 and 57% passing 4.75 mm (average 38%)
between 0.2 and 2.3% passing 75 μ m (average 1.0%)

Los Angeles abrasion loss: 17.3 to 32.0% (23.4% average)

Recommended for use as borrow, subbase, and base course (31.5 mm crushed) aggregate.

Estimated reserves are for all three levels of outwash terraces to the north of the Southwest Miramichi River, east of McCarty Island.

LOCATION #: J8-5 NTS: 21 J/8
 Type of Deposit: Ancient alluvium County: Northumberland
 Exposure Type: Pit Parish: Ludlow
 Status: Inactive UTM: 032 516

SECTION DESCRIPTION & COMMENTS:

0.4 m Soil: Silty soil, developed on the underlying material.

0.4 m Sand: Clean, fine to coarse sand, with a few large gravel clasts scattered throughout.

0.7 m Sandy Gravel: Crudely horizontally stratified, fine to very coarse gravel with medium to very coarse sand, with a few small cobbles; clasts are subrounded to well rounded; the sample was obtained from this unit.

0.9 m Slump Covered: Assumed to be material as above; the base of the pit is apparently just above the water table.

Maximum clast size in the pit area is 0.9 m. However, such large clasts are not common. A number of stockpiles of crushed and screened materials are present on the site.

DOT (1980) test data for the pit area is as follows:

Mechanical Analysis - Pit Run:

32% passing 4.75 mm; 0.5% passing 75 μ m

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	75mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing	86.7	54.3	50.1	38.9	29.8	23.6	16.2	5.5	0.8	0.3	0.1

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 53%

felsic intrusive 25; metasediments 16;
 sandstone 7; metavolcanics 3; mafic
 intrusive 1; schist 1

Sound Lithotypes 47%

metasediments 14; felsic intrusive 10;
 quartzite 8; mafic extrusive 5;
 quartz 4; felsic extrusive 3;
 metavolcanics 2; sandstone 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
Alluvium 48	30	1.5	450,000
Outwash 93	20	2	400,000

LOCATION #: J8-5 (Continued)

SECTION DESCRIPTION & COMMENTS:

Los Angeles abrasion loss: 19.9%

Mechanical Analysis - Crushed:

53 and 65% passing 4.75 mm

3.0 and 3.2% passing 75 μ m

Absorption: stone - 1.32; sand - 1.27, 1.30

Soundness Loss: stone - 3.04, 3.93; sand - 4.76, 6.06

Sand Equivalent: 82, 84

Recommended for use as asphaltic base and seal aggregate.

Reserve estimates for the outwash on the south side of the Southwest Miramichi River in the Ludlow area are also included. DOT (1962) testing of this material gave the following results:

Mechanical Analysis: coarse aggregate (2 samples)

41.4 and 51.5% passing 4.75 mm

0.7 and 0.8% passing 75 μ m

fine aggregate (1 sample)

92.5% passing 4.75 m; 0.6% passing 75 μ m

Los Angeles abrasion loss: 25.1 to 26.4% (25.8% average)

Coarse aggregate recommended for borrow, subbase, and base course use; fine aggregate for borrow.

LOCATION #: J8-6 NTS: 21 J/8
 Type of Deposit: Glaciofluvial outwash County: Sunbury
 Exposure Type: Pit Parish: Maugerville
 Status: Inactive UTM: 194 408

SECTION DESCRIPTION & COMMENTS:

0.5 m Soil: Slightly silty soil, developed on a sandy gravel.

1.1 m Gravelly Sand and Sandy Gravel: Interbedded fine to coarse sand with minor gravel, and fine to coarse gravel with medium to coarse sand; beds are generally 5 to 20 cm thick; clasts are subrounded to rounded; Sample A was obtained from this unit.

0.8 m Sand: Well-sorted, fine to medium sand, with minor coarse to very coarse sand; a very thin gravelly band is present; Sample B was obtained from this unit.

1.0 m Slump Covered: Assumed to be sand as above; 1+ m of sand is present below the base of the pit.

Maximum clast size in the pit area is 0.25 m.

This relatively small deposit is the only significant outwash deposit along this portion of the Cains River. The fact that it consists of gravelly material over sand suggests that it may be of deltaic origin, possibly formed in a small lake due to blockage of the valley downstream by till.

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										
A	85.3	80.4	72.8	66.1	58.3	50.4	29.2	5.2	0.7	0.1
B			98.7	96.7	94.6	92.0	82.1	34.2	5.4	0.8

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	46%	Sound Lithotypes	54%
sandstone 45; conglomerate 1		sandstone 35; quartzite 4; siltstone 3; metasediments 3; felsic extrusive 2; conglomerate 2; quartz 2; mafic extrusive 1; greywacke 1; metavolcanic 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
10	8	2	160,000

APPENDIX N

SITE DESCRIPTIONS

CHATHAM MAP AREA

21 P/3

LOCATION #:	P3-1	NTS:	21 P/3
Type of Deposit:	Ablation till	County:	Northumberland
Exposure Type:	Pit	Parish:	Alnwick
Status:	Active on demand	UTM:	186 353

SECTION DESCRIPTION & COMMENTS:

A small pit, opened into a deposit of ablation till, exposes about 5 m of coarse and poorly sorted material. Clasts are angular and are up to cobble size with a few small boulders present. A high percentage of the clasts consists of poorly indurated Carboniferous sandstone. The matrix is sandy, and manganese-rich shadow pebbles are common in the upper part of the section.

The pit is operated in two lifts and the material is used locally as a source of fill. Mapping by Gauthier (1982) indicates the presence of a belt of ablation moraine extending northeasterly from P3-1. This suggests that similar material is present in the general area.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
			See Text Above

LOCATION #: P3-2
Type of Deposit: Till
Exposure Type: Pit
Status: Inactive

NTS: 21 P/3
County: Northumberland
Parish: Newcastle
UTM: 139 327

SECTION DESCRIPTION & COMMENTS:

This small pit exhibits some of the characteristics common to many shallow borrow pits found over Carboniferous terrain and above the limit of marine submergence. The average section height is 2.5 m and displays a 0.5 m thick sandy loam cover overlying a silty pebbly sand till that grades into the shattered sandstone bedrock. Fresh bedrock is exposed on the floor of the pit.

A 0.6 m large gneiss erratic was noted.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES: N/A

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable

LOCATION #: P3-3
Type of Deposit: Outwash
Exposure Type: Pits
Status: Inactive

NTS: 21 P/3
County: Northumberland
Parish: Newcastle
UTM: 201 233

SECTION DESCRIPTION & COMMENTS:

A poorly defined glaciofluvial outwash deposit has been worked intermittently in the Bartibog River valley. At the time of visit, all sections were badly slumped and the pit area was partly covered by vegetation. The deposit has been worked from several levels and where exposed, the material consists of well-sorted medium sand and variable mixtures of sand and gravel. Water accumulating on the floor of some lifts suggests the presence of an impermeable layer (till or silt/clay) that may restrict further extraction of aggregate. The abundance of Miramichi Highlands lithotypes enhances the soundness of the coarse aggregate.

In the middle part of the pit, 4 to 5 m slumped sections display about 40 cm of silty sand at the top, overlying a thin band of reddish medium-grained sand and then sand and gravel. An 8 m poorly exposed river cut shows about 20 cm of a reddish brown, pebbly clay silt diamicton at the top, overlying brown sand with reddish laminae, overlying in turn, sand and gravel.

Another pit has been opened in the deposit, about 1 km northwest of P3-3. At that site, the slumped sections average 3 m high and consist of sand with some gravel. A thin bed of reddish, silty diamicton overlying sandy gravel was noted on the floor of the pit.

(CONTINUED)

MECHANICAL ANALYSIS:

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing	100.0	99.4	89.6	83.3	77.8	72.9	65.9	30.6	2.8	0.7

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	35%	Sound Lithotypes	65%
sandstone 34; felsic intrusive 1		quartz and quartzite 32; metasediment 20; felsic intrusive 9; felsic volcanic 2; sandstone 2	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
25	-	3	Undetermined (See Text)

LOCATION #: P3-3 (Continued)

SECTION DESCRIPTION & COMMENTS:

For about 5 km upstream of P3-3, the Bartibog River is flanked by a wide (up to 600 m) terrace to the west. Study of aerial photographs shows the terrace surface to be slightly hummocky. Limited field work suggests that it consists of a till blanket overlying a flat bedrock surface. The possibility of finding buried granular aggregate material in this section of the Bartibog River valley does exist, but more exploratory work is needed to verify this.

LOCATION #: P3-4
Type of Deposit: Marine
Exposure Type: Pits
Status: Active on demand

NTS: 21 P/3
County: Northumberland
Parish: Alnwick
UTM: 257 221

SECTION DESCRIPTION & COMMENTS:

The active section displayed 1 m of well-stratified, horizontally bedded sand and sandy gravel beds. The overall grade consists of fine to medium sand and the percentage of coarse material is low: a few cobbly and pebbly beds and rarely, small boulders on the pit floor. Clasts are subrounded to well rounded.

The deposit appears to have originated as glaciofluvial outwash but was probably reworked by the sea during the submergence that followed deglaciation. Vegetation-covered ridges that cross the swampy grounds south of P3-4 have been interpreted as beach ridges.

The local topography is very subdued and the relief of the deposit very low. Poor drainage limits extraction: DOT reports indicate that the water table depth averages 2.5 m and ranges from 1.0 to 4.0 m. Other DOT (1967) tests show the following:

Percentage finer than 75 um: range 0.5 to 2.6%; mode 1.3%
Los Angeles abrasion loss: range 42.7 to 61.9%; mode 50.2%
Recommended usage: borrow

An excess of medium-grained sand indicates that the material will be difficult to compact.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing	93.3	86.9	84.5	75.6	56.4	50.0	43.4	36.4	6.5	1.9	0.9

LITHOLOGIC ANALYSIS:

<u>Unsound Lithotypes</u>	<u>50%</u>	<u>Sound Lithotypes</u>	<u>50%</u>
sandstone 49; felsic intrusive 1		quartz and quartzite 19; felsic intrusive 13; metasediment 10; sandstone 3; mafic intrusive 2; felsic volcanic 2; mafic volcanic 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
75	10	2.5	250,000

LOCATION #:	P3-5	NTS:	21 P/3
Type of Deposit:	Marine	County:	Northumberland
Exposure Type:	Pit	Parish:	Alnwick
Status:	Abandoned	UTM:	318 283

SECTION DESCRIPTION & COMMENTS:

1.0 m Sand: Coarse, loose-textured, well-sorted, pebbly sand.

1.5 m Sand and Silt: Stratified fine to medium sand and compact, mottled clayey silt.

Bedrock: Sandstone.

This flooded excavation is typical of the pits opened over Carboniferous bedrock, below the maximum limit of marine submergence. The sections generally display 0.5 to 2.0 m of sandy material over fractured sandstone with fresh bedrock on the floor of the pit. The material is used as fill.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES: N/A

total deposit area	area workable	average thickness	recoverable
(hectares)	(hectares)	(metres)	reserves (m ³)
			probable

LOCATION #:	P3-6	NTS:	21 P/3
Type of Deposit:	Marine	County:	Northumberland
Exposure Type:	Pits	Parish:	Alnwick
Status:	Active on demand	UTM:	348 290

SECTION DESCRIPTION & COMMENTS:

Most of the extraction has taken place in the vicinity of P3-6. Fresh exposures display well-stratified, well-sorted sand and pebble gravel. Overall, the material is of medium grade. A few boulders have been noted. Parts of the pit were flooded at the time of visit and this suggests the presence of till or clay at shallow depth.

A high percentage of exotic lithologies suggests that the core of the deposit is of glaciofluvial origin, although significant reworking by the sea probably took place during the period of submergence that followed deglaciation. It is interesting to note a certain morphological resemblance between this deposit and nearby Hay Island.

DOT (1960) tested the material. Results are summarized below:

Percentage finer than 75 um:	range 0.1 to 1.3%; mode 1.1%
Los Angeles abrasion loss:	range 31.9 to 24.6%
Proposed usage:	crushing

Most of the calculated reserves are located in the western portion of the deposit, centred about what is thought to be a glaciofluvial core. The eastern portion of the deposit is probably the result of longshore drift and is not as thick.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing	98.6	91.9	87.6	73.9	60.0	47.6	35.4	20.6	3.8	1.0	0.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	33%	Sound Lithotypes	67%
sandstone 30; metasediment 1; shale 1; weathered 1		quartzite 21; felsic intrusive 20; metasediment 19; felsic volcanic 5; mafic intrusive 2	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
185	20	2.5	500,000

LOCATION #: P3-7
Type of Deposit: Marine
Exposure Type: Pit
Status: Inactive

NTS: 21 P/3
County: Northumberland
Parish: Alnwick
UTM: 377 295

SECTION DESCRIPTION & COMMENTS:

2.5 m Sand and Gravel: Stratified and moderately sorted medium sand, pebbly sand and sandy coarse pebble to cobble gravel. Clasts are generally subrounded to well rounded and of varied lithologies, although Carboniferous sandstone predominates.

0.5 m Bedrock: Fractured flaggy sandstone grading downward into more competent bedrock.

All sections were slumped and brown sandstone bedrock is exposed on the floor of the pit. The excavation is used as a dump site for dredge spoils.

MECHANICAL ANALYSIS:

sieve	50mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing	95.4	90.1	86.6	74.3	59.1	45.1	35.3	27.1	13.2	3.9	2.5

LITHOLOGIC ANALYSIS:

Unsound Lithotypes	48%	Sound Lithotypes	52%
sandstone 41; felsic intrusive 2; schist 2; weathered 2; metasediment 1		quartz and quartzite 22; schist 10; felsic intrusive 7; metasediment 6; mafic intrusive 2; felsic volcanic 2; sandstone 2; breccia 1	

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable (See P3-6)
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LOCATION #:	P3-8	NTS:	21 P/3
Type of Deposit:	Marine	County:	Northumberland
Exposure Type:	Pit	Parish:	Alnwick
Status:	Active on demand	UTM:	346 316

SECTION DESCRIPTION & COMMENTS:

Most of the pit is abandoned, but some minor activity is taking place in the northeast corner.

Sections average 2.5 m high and expose about 1 m of stratified, poorly to moderately sorted, pebbly sand, over fractured, flaggy sandstone. A high proportion of the clasts found in the marine sediments that blanket the bedrock surface consist of sandstone, although some Miramichi Highlands lithologies are also present. This pit is characteristic of the many shallow excavations found in the area, along the coast.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable

LOCATION #:	P3-9	NTS:	21 P/3
Type of Deposit:	Ablation till	County:	Northumberland
Exposure Type:	Pit	Parish:	Alnwick
Status:	Active on demand	UTM:	358 334

SECTION DESCRIPTION & COMMENTS:

1.5 m Sand and Gravel: Loose, coarse and poorly sorted sandy gravel. More than 90% of the clasts consist of angular sandstone fragments. A few mineralized sulphide cobbles were noted, suggesting an easterly movement of ice across the area.

0.5 m Silty Gravelly Sand: Compact material containing lenses of dense red till.

4.0 m Slump Covered: Assumed to be till.

This small pit has been opened in a morainic hummock located at the eastern extremity of a broad zone of ablation moraine. The reserve estimate applies to the hummock that includes P3-9. Similar material can be found west of the present site. The aggregate is suitable only as a source of low-grade fill.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600µm	300µm	150µm	75µm
% passing										

LITHOLOGIC ANALYSIS: N/A

<u>Unsound Lithotypes</u>	<u>%</u>	<u>Sound Lithotypes</u>	<u>%</u>
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ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
15	3	3	90,000

LOCATION #: P3-10
Type of Deposit: Marine
Exposure Type: Pit
Status: Abandoned

NTS: 21 P/3
County: Northumberland
Parish: Chatham
UTM: 198 145

SECTION DESCRIPTION & COMMENTS:

This pit, developed in a shallow marine deposit, is now abandoned, partly flooded and largely overgrown. According to a DOT field report, the deposit consisted of 0.5 to 2.0 m of fine-grained gravel overlying silt or clay. Other DOT (1967) tests gave the following results:

Percentage finer than 75 um: 1.6%, 1.8%
Los Angeles abrasion loss: 53.5%
Proposed usage: Subbase

The local topography is very subdued making it difficult to interpret the boundaries of the deposit. The economic value of the site is considered to be low because of the shallow nature of the aggregate body.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
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LOCATION #: P3-11
Type of Deposit: Marine
Exposure Type: Pits
Status: Inactive

NTS: 21 P/3
County: Northumberland
Parish: Glenelg
UTM: 256 105

SECTION DESCRIPTION & COMMENTS:

A series of excavations displays up to 2 m of sandy material. The pits are commonly flooded. DOT (1966) field tests indicate the presence of clay or sandstone bedrock at shallow depths. A sample analyzed by DOT gave the following results:

Percentage finer than 75 um: 3.7%
Los Angeles abrasion loss: 60.3%

The sieve analysis pointed to a deficiency in the stone and coarse sand fraction that would make the material difficult to compact. The only recommended usage was for borrow. Recoverable reserves are limited by the shallow water table and the generally swampy character of the surrounding land.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES: N/A

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
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LOCATION #: P3-12
Type of Deposit: Marine
Exposure Type: Pit
Status: Abandoned

NTS: 21 P/3
County: Northumberland
Parish: Glenelg
UTM: 295 138

SECTION DESCRIPTION & COMMENTS:

About 2 m of well-sorted, medium sand is exposed in this small flooded and abandoned pit. Although significant volumes of sand are thought to be present in the general area, the shallow nature of the deposit strongly limits its importance as an economic source of sand.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
61	10	2	200,000

LOCATION #: P3-13
Type of Deposit: Marine
Exposure Type: Pit
Status: Inactive

NTS: 21 P/3
County: Northumberland
Parish: Hardwicke
UTM: 390 137

SECTION DESCRIPTION & COMMENTS:

Sections in the pit expose a thin blanket of sand over red clayey to cobbly silty sand till over fractured sandstone bedrock. The material was tested by DOT (1960) and the following results were obtained:

Percentage finer than 75 um: range 0.3 to 0.8%; mode 0.5%
Los Angeles abrasion loss: 67.4 to 72.2%

Although field tests by DOT suggest that the material can be up to 3 m thick, the volume of recoverable granular aggregate is probably limited and of borrow quality only.

MECHANICAL ANALYSIS: N/A

sieve	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600um	300um	150um	75um
% passing										

LITHOLOGIC ANALYSIS: N/A

Unsound Lithotypes %

Sound Lithotypes %

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable Limited

LOCATION #: P3-14
Type of Deposit: Marine
Exposure Type: Pit
Status: Inactive

NTS: 21 P/3
County: Northumberland
Parish: Hardwicke
UTM: 395 097

SECTION DESCRIPTION & COMMENTS:

3.0 m Sand: Well-sorted sand with some beds of sandy pebble gravel. Clasts are well rounded to subrounded. Miramichi Highlands lithologies are common and may indicate a glaciofluvial origin to the deposit.

Flooding in the pit suggests that the practical extraction depth may be limited. Testing of the material by DOT (1964, 1977) gave the following results:

Percentage finer than 75 μ m: range 0.8 to 3.7%; mode 2.1%
Los Angeles abrasion loss: range 64.1 to 76.2%; mode 70.5%
Recommended usage: borrow and filter material.

Because of the low relief of the deposit, it is difficult to precisely trace its boundaries. Test pitting would be necessary to establish a reserve estimate.

MECHANICAL ANALYSIS:

sieve	31.5mm	25mm	19mm	9.5mm	4.75mm	2.36mm	1.18mm	600 μ m	300 μ m	150 μ m	75 μ m
% passing	95.7	93.5	90.4	77.9	68.0	60.8	50.7	33.2	7.0	2.1	1.2

LITHOLOGIC ANALYSIS:

Unsound Lithotypes 58%
sandstone 58

Sound Lithotypes 42%
felsic intrusive 11; quartz and
quartzite 11; metasediment 6; sandstone 5;
felsic volcanic 4; greywacke 3; schist 1;
tuff 1

ESTIMATION OF RESERVES:

total deposit area (hectares)	area workable (hectares)	average thickness (metres)	recoverable reserves (m ³) probable
8	-	2.5	-